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- AT&T Join PC Battle
- Don Lancaster Explains Addressing Modes
- Review of Seequa's Chameleon Plus
- How Color CRT's Work
- CP/M & PC Public Domain Software
- Software Reviews
- Computer and Robotics Columns



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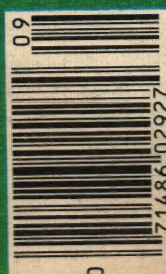
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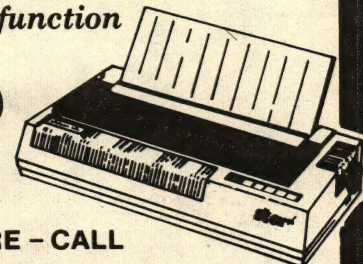
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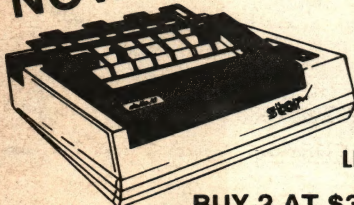
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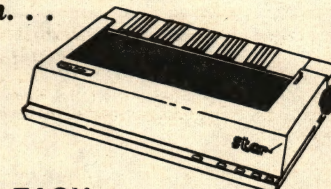
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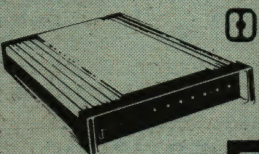
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Computers Go Back To School

EDITOR'S NOTE

This month we present a group of articles on educational computing by three educators from different parts of the country. Lucretia A. Olivet is a teacher in Special Education, in the New York City public schools. Lon Andrews teaches high school (Science) in Florida and Hardin Brothers is a high school teacher in southern California. They all have extensive experience with personal computers.

By L.A. Olivet

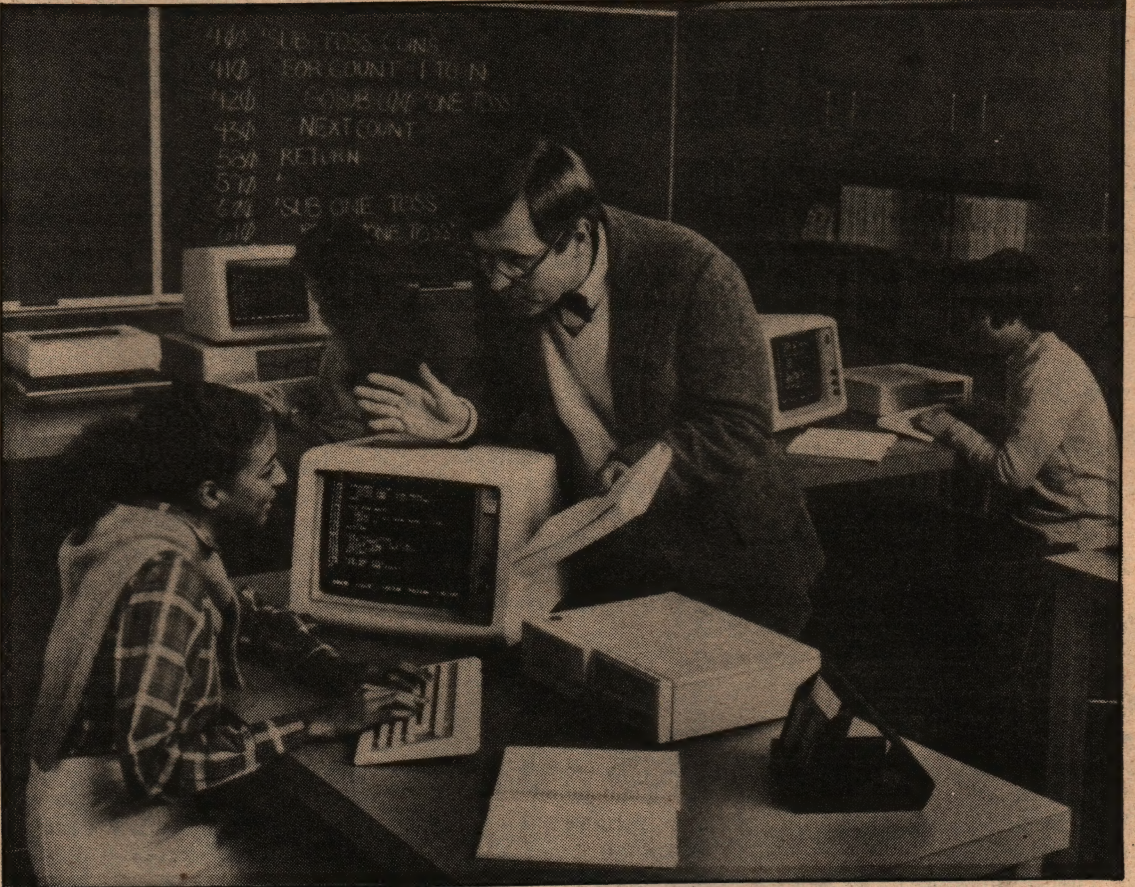
There are fads and styles in education just as there are in every other field and this year computers are "in" the classroom as never before. The trend has been slowly building ever since the start of the personal computer revolution in 1976. Educators have been among the first to recognize the value of the personal computer for computer literacy and computer aided instruction, but they have been held back by teacher fear of the computer and by severe money problems in the schools. Now more and more states are opening their purse strings to provide classroom computers and software to operate them. It is estimated that there are 300,000 computers already installed and that there will be over 2 million computers in US schools by the end of 1984. Predictions of almost 6 million by 1988 are also made by educational and industrial studies but these are merely projections of present trends and the picture may change with advances in technology and the growing shortage of teachers.

As with most educational trends, the colleges lead the parade. Most colleges have had computer labs for the past ten years. These have been mainly devoted to computer science, engineering, and technical and business schools, but in the past few years liberal arts have been using the computer facilities more and more. The basis for these college computer facilities have largely been mainframe time sharing systems, or large minicomputers. It is only within the past three years that personal computers have made their way into the classrooms. Another major use of personal computers at the college level has been the education of business people and teachers in the use of the computers

themselves. Almost every university and college in the country has extension courses in Computer Literacy. These adult courses have provided the money for the expansion of computer facilities based upon personal computers. They have also trained thousands of grade school and high school teachers in computer operation.

This year marks the start of student's use of personal computers for all levels of study. Many schools have required students to own, or lease a personal computer and developed courses that utilize the computer as a vital part of the instruction. Companies like Apple, IBM, DEC and Commodore have encouraged this trend by making large grants of equipment, software and money. Just as students of the recent generations were required to use a typewriter for the submission of work, so students of the next few college classes will be required to use a computer to do their work no matter what their field of study is.

It is in the high schools and jr. high schools where the greatest impact of personal computers is felt. Here is where most of the installed base of personal computers is and here



IBM Computers In The Classroom.

is where the greatest growth will be.

At this time Apple holds the lead in the number of installed personal computers almost 50% of the school computers

are Apples, mostly Apple IIs. Tandy holds second place with about 20% and Commodore is in third with about 16%. IBM, Atari and others command a small percentage of the per-

sonal computer market at this time. Commodore's strength is mainly in the lower grades where the price has been the

Continued on page 8

Computers In The High School

By Lon Andrews

We are moving from an industrial society to an information society where gathering and handling information is the main product. The computer is the main tool in such a society. This is putting a strain on the educational system to bring about changes that will allow us to keep up. At this time about 3 out of 4 schools have microcomputers, an increase of about 500 percent since 1982.

At the present time our high school uses about 60 microcomputers in various programs. We use almost exclusively TRS-80 computers and most of these are Model IV's. These have been placed into three general types of use; Computer Sciences, Vocational Education and individual classroom applications. The Computer Sciences and Vocational Education each have a lab with two networks.

The Computer Sciences Lab serves the classes in Computer Literacy, Programming, and various courses for students interested in careers in computer technology. The Vocational Lab serves the needs of students headed toward careers in the areas that use the computer as an office tool for word processing, bookkeeping and office management. Both of these labs use Radio Shack Networks hosted by twin disk machines. The networks can cut time available for instruction by as much as 1/4th of the period due to the download time needed. We have minimized this by using two networks in each lab with each one using half of the possible number of student machines.

Equipment needed for your applications will depend on several factors. First and foremost is budget. It is better to wait than to buy something that will only do half the job and then try to patch it up later. For individual classroom

use we are using 64K twin disk machines. Single disk machines will drive you batty exchanging disks. It is easy for a student to make a mistake and ZAP! The printer again depends on the use. For word processing a Daisy Wheel provides the print you want for correspondence unless a good quality dot matrix is available and is acceptable to your taste. We use the DMP2100 and swear by it.

Networks do well in the multiple station labs. Two networks, two twin disk hosts with a third external drive each, two printers and 16 non disk student machines make an excellent lab. An extra host machine will eliminate down time and provide another station. There are a lot of cable connections to be made in each network. Most of the problems we have had have been with these connections. As I mentioned, the download and upload time can be a problem. Each station has to receive the program from the host

machine and the host sends the program out in the order of request. First come -- first served! If the program being used requires a lot of interaction with the host, you can look for a traffic jam and a delay.

Individual classroom use is as varied as the number of teachers and subjects. Most of the classroom use is in the area of applications rather than instruction. Some subjects lend themselves to Computer Aided Instruction (CAI) better than others. For my use the programs available have fallen short of the mark. Matching software to text materials can be a major pain. One of the best classroom uses I have seen is with the Specific Learning Disability classes where the students work with remedial skills individually and at their own pace. This software is geared to the State Assessment Tests and provides required remediation. In some cases

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Back To School Continued from page 7

greatest factor in the selection of computer equipment.

In the coming year IBM will make a strong effort to increase their strength in school use. Their PCjr, which was to be the school computer at the entry level has proved to be a dud. Its price/performance has all but ruled it out of contention. Even when schools are offered it for nothing, they refuse because of the lack of software and the price of the few programs that exist. Apple with the reduction in price of the Apple IIe and the portable Apple IIc plus the huge available library of educational software will be very hard to beat. TRS-80 seems to be barely holding their own in the market. Their major efforts have been in the business market with the Tandy 2000. This is too expensive a computer for the high schools where their strength has been in the past. The TRS-80 Model 4 and the Model 100 Portable are popular but not to the extent that the Model III was. Some schools are using larger TRS-80 Computers in a network and they find this to be a cost effective system.

The Commodore 64 and the CBM computers still have a large installed base in the

schools and they will be in heavy use during the next two years. Commodore's very existence may hinge on the replacement of the school computers now in use.

A strong new contender for the educational market has arrived from England where the Acorn BBC Computer is the official school computer. The Acorn Computer Co. in the United States is offering school districts a package that includes low cost computers, teacher training, text books, and a library of educational software that has proven to have value through use in England. They now have over 500 approved programs from 40 of this countries leading software houses. These cover the needs of elementary, secondary schools and colleges.

The Acorn package has won some support because it is so complete and the price is right. However they have a long way to go to meet Apple's head start.

TEACHER REACTION

Up until this year computers have largely been used for so-called Computer Literacy courses. Science and Math Departments have also been strong supporters of computer aided instruction in secondary schools and colleges. This year

marks the real start of the installation of computers into elementary schools for computer aided instruction. There is bound to be a big teacher backlash in the states where teacher's salaries have lagged behind the national wage scales and where inflation has eroded the fixed pay of teachers. This backlash is not the reaction of Neo-Luddites against new machinery, but shock that the school boards can find millions of dollars to buy computers, but not for teacher's pay.

The effective use of computers will require a restructuring of the entire curriculum for elementary schools. This is going to take time and lots of money because the only way for computer aided instruction to be effective is to coordinate good software with new types of textbooks. Teachers will have to re-trained to use these materials and classrooms will have to be furnished to accommodate the computers.

Even if all these things are done, there is a great question whether the quality of education will improve as a result. There is strong evidence that the best education is obtained from the interaction of pupils with a good human teacher rather than the instructional materials used.

THE SOFTWARE INDUSTRY

The educational software industry has been growing slowly over the past few years. Many of the companies such as Krell Software Corporation of Stony Brook, N.Y. have grown out of the colleges. Krell which writes educational software for nearly all personal computers grew out of the State University of New York at Stony Brook L.I., N.Y. This school has been in the forefront of computer aided instruction ever since the first microcomputers were developed. I name them only as typical of this kind of company which evolved from an academic background. There are thousands of small companies writing software for schools. However, most of the material in the future will come from large publishers who have entered the field. Scholastic Software is typical, they are the largest publisher of children's books and are now seeking to become one of the largest publishers of educational software. CBS Software, the offspring of the CBS Publishing group has entered the field with a catalog of programs to be used both in the classroom and as supplements at home. They have not neglected the pro-school child who will be able to use soft-

ware based upon the popular childrens TV characters of The Children's Television Workshop.

Sierra another established software company has joined with Walt Disney Telecommunications to produce software based upon the Disney characters. This will be used as instructional programs for kids in the 4 to 9 year old group. Almost every publisher of school textbooks and materials has joined in the competition to sell programs to schools and to parents to use at home.

The schools themselves have not been receptive to this flood of educational software. They simply do not have the money to buy it and once the computers are installed they will not have continuing funds to keep replacing it. Software is not like textbooks, you can't stick it in a closet and use it for 20 years! The reaction to this has been the development of networks to share programs and to distribute public domain software. The computer companies themselves have been aware of this situation and have helped by supplying huge libraries of software to schools. This can be expected to continue as long as they are selling computers to the schools. Commodore and Ap-

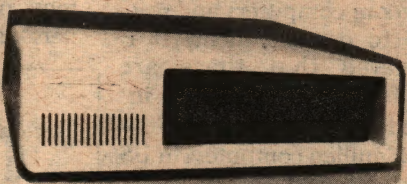
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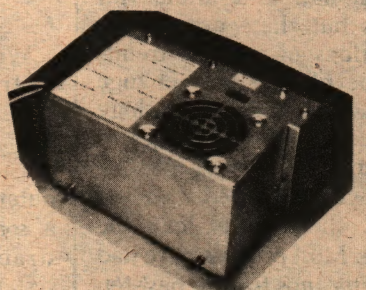
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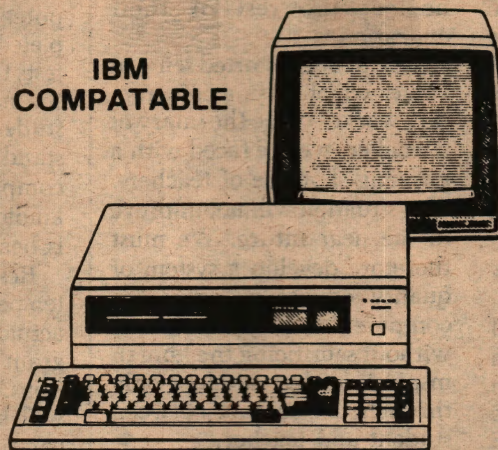
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Back To School

Continued from page 8

ple have been the leaders in this effort, although Tandy and IBM have also been active.

THE FUTURE OF EDUCATIONAL COMPUTING

This article has raised a lot of questions and discussed many trends, but offers no answers. It is too soon to tell how the computer will change our schools, but we must recognize that the change is underway and that the 1984-1985 school year is really the start of this movement.

Both state and federal governments have long been aware that educational reform was necessary to maintain the United States lead in

technological innovation. We are loosing that lead to Asia and Europe and are becoming a service economy. We must educate our children in the use of computers but we cannot neglect the rest of their education.

Due to our distorted sense of values which pays a construction worker twice the salary of a teacher, we are faced with a growing shortage of teachers. This situation will not improve in the near future. We must therefore develop a system of quality education using the computer as a teaching tool without sacrificing the human inspiration that develops only through the contact between student and teacher.

Computers In High School

Continued from page 7

students with a disability are remediated 2-3 times faster than students without a handicap (and also without a computer). When they have completed a skill or task the teacher tests them and they move on to the next level. Some of these students were at a complete stand still until the use of the computers provided a spark to kindle a fire of motivation that is beautiful to watch.

Research tells us that only ten percent of our students will actually need to be able to program in their future occupations. The rest of the students will have to be able to use a computer at some point in their life. This has created a need for a new level of instruction- Computer Applications. Being able to use existing software for tasks that suit your needs is the area of the greatest need. Some of the most frustrating days of my life have been when I was trying to get a new software package up and running to where I could use it at school and teach its use to students. Without some training in the use of a computer and what to expect from various types of software this can be an impossible task. No one course can begin to teach the existing programs much less keep up with the new ones coming out each month but general types can and should be taught. Data base, word processing, home budget, spreadsheet and how to use CAI programs can be presented. Once this general knowledge is assimilated it is not too big a step to cross over to a new program.

With more and more micros appearing in the home for the student to use, the complexion of computer use is changing at the high school level. Two years ago a term paper

prepared by one of my students was refused by his teacher since the computer did all the work. Now papers such as this are common place. Word processing, dictionary, and bibliography programs are used daily in paper preparation. The students must still be able to research the material, organize their thoughts and write the paper. Many of my students work at home on their computer and bring the disk to school to use the printers in the lab.

All of my tests are prepared with a test generator program that allows many different forms of the same test questions just as easily as preparing one test. It also prepares an answer key and will test students individually using the computer making make-up tests simple to give while I am doing something else. Many other classroom management chores can be accomplished with the computer, however I have seen teachers spend more time to use the computer for these tasks than they would have by the older method. Sometimes the computer between the ears is a better tool than the one on the desk. Individual preference will be the deciding factor as to the actual advantage in this area.

Preparation for some of the standardized tests is becoming a popular use for the micro. The student is given a pre-test and a program of study is prepared by the computer. After completing the study of the materials as outlined, a post test is given and the results are compared. From this a potential score for the real test can be ascertained.

Most CAI programs require a standalone machine. This hinders their use in the classroom except for individual remediation. This aspect of computer use in the school is getting more and more attractive. Remediation is an activity that is naturally suited to the micro. Software for this is a problem unless the publishers of the texts produce software to match their books. Our remediation software was produced locally. CAI for the networks is fine if you can find the software. So far I haven't seen much that impressed me for the high school.

This brings us to the point of what software to get and where to find it. Software selection will make or break your program (no pun intended). It is hard to get just exactly the right package to fit your needs. So much software was turned out in a hurry to get on the Educational Bandwagon that much of isn't suitable for



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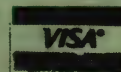
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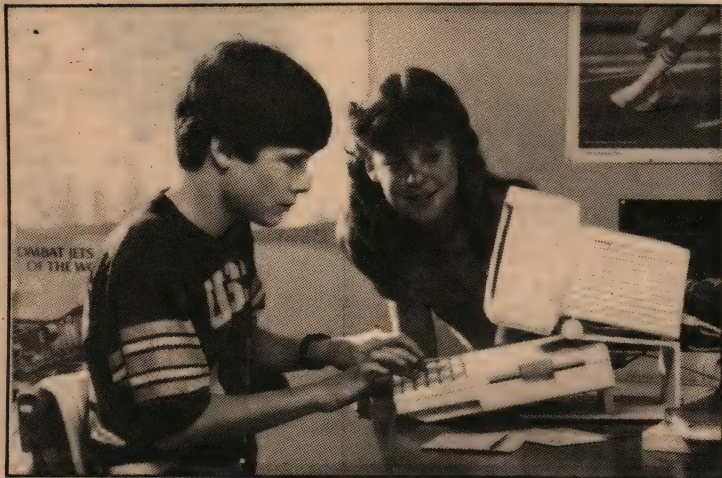
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Computers In High School
Continued from page 10

school use. My mail box at school is constantly stuffed with glossy mail promotions

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astronomical and the budget won't stand many mistakes.

Most companies are understandably reluctant to send software for examination or on approval. Too many have done this to find out that it was copied and returned as 'not suitable for our needs'. If you can establish a review committee for the district you stand a better chance to get review copies. Send a copy of the review to the publisher so that they can see the results. Encourage schools to use the same software. Multiple copy purchases can save as much as 50 percent of the list price. We were able to get enough of our schools to use the same word processing program that a single copy ended up costing less than \$80 rather than the \$150 as listed.

Read all the periodicals that you can find that deal with your computer. Most have a magazine(s) that deal especially with that brand. Computer Shopper is one that carries a lot of information that will help plus new product releases and product reviews. 80 Micro covers the same type of information for TRS 80 computers exclusively. Read the ads carefully. What they do not say is often as important as what they do say. If in doubt invest in a phone call to find out for sure. Talk to other educators and find out what works for them in their schools. A lot of excellent software is home-grown and most are anxious to share with other schools. Some have been developed on Federal Grant

programs and are available if you supply the disks.

When you decide to buy be sure to specify on the purchase order what computer and printer you are buying the software to run on. Some do not specify in the ads but when you get the order they require a specific printer or DOS. If your luck is like mine you won't happen to have what they specify. I am afraid to guess how many dollars have been spent for software that ends up on the shelf because it won't run on available equipment or isn't suitable for one reason or another. A lot of the companies are insisting on prepayment even with a purchase order. Bookkeepers love this, especially when the company can't fill the entire order and you end up with a credit slip that might eventually provide a refund. This refund will probably cost twice what it is worth in the long run due to the paper work necessary. If you are using a network be even more careful to specify what you want the software to run on when you write out the purchase order.

Don't plan to get a program early in September and start using it immediately with the students. It takes time to get some software packages up and running. I know that 'any child can do it' but I have problems with a swing set that the store claims will be set up in a half hour by two beautiful children (on the package label). Give yourself time to learn how it works before you start with the students. This will save a lot of aggravation and frustration.

Once your software arrives make backup copies and file the masters immediately under lock and key. As I write this I am replacing two years of work that was vandalized when my lab was broken into last week. None of the masters were bothered as they were locked up in a different location but all my working copies and data disks are gone. I've changed my backup policy now and store my data backups in another location also. It takes a little more time but anything is better than what I'm going through this week.

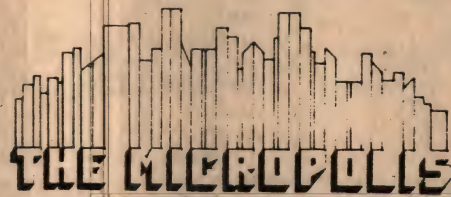
What software is needed will depend on the situation. A good word processor, data base, dictionary, and statistical analysis program will round out most individual use situations. Bookkeeping (accounts receivable and payable, and a general ledger) payroll, typing tutor and spreadsheet programs added to this will fill out the vocational course. Computer Sciences will use more varied programs due to the languages required for the course. Add to these the programs that the individual teacher finds useable and desirable and the package is complete. Many will not run on the networks due to the memory requirements and the makeup of the network software.

No one set of answers will meet every situation. Good planning and research is a must to keep from having thousands of dollars worth of white elephants on hand. New equipment and software is being released constantly as the technology advances making the policy of 'Make haste slowly' appears to be the best policy to keep out of trouble. Remedial education will be one of the most important uses in secondary schools for some time to come due to new legislative requirements on the school systems. While it will not replace the teachers, the computer does free them from many tasks that take valuable time from group instruction. ●

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Computer Literacy Isn't Enough

by Hardin Brothers

Something has gone wrong with the microcomputer revolution, and I'm angry about it. I'm angry when non-computing friends ask me if I use my modem to break into business and government mainframes. I'm angry when other computer owners ask me for free software.

I'm angry that "pirate" bulletin boards provide stolen account numbers and passwords, as well as commercial programs, to anyone with an inexpensive computer ter-

minal and modem. I'm angry when I hear pre-teens brag about their collection of pirated software, often including programs like Lotus 1-2-3 and dBaseII as well as the latest arcade-style games.

I'm realistic enough to know that any large group of people will include some who are dishonest. But it seems to me that too large a percentage of the new "computer literates" in this country have become computer criminals.

Certainly part of the problem stems from the economics of being a computer hobbyist. Many people stretch their budgets to the limit to buy a computer, get it home and find that it will do nothing without software. After buying the machine they can't afford the software to do what they want,

and so they get a "free" copy of a program from a friend.

But the problem is much larger than that. Many people just do not associate illegal computer activities with the idea of crime. Too often, cracking a disk protection code or raiding a mainframe computer is applauded as a mark of cleverness instead of being condemned as the theft that it actually is.

The media bear some of the responsibility for this distressing attitude. Until recently, stories about computer criminals, especially teenagers and pre-teens, seemed to be almost laudatory. The news reports focused on the criminal's cleverness. Imagine parallel stories about the cleverness of vandals who spray paint buildings or

burglars stealing the combination for a bank safe.

Schools also bear some of the responsibility for current attitudes, especially those held by young computerists. One software publisher has given up selling educational software. He claims that too often a single "evaluation" copy of a program ended up in every computer classroom in the entire district. Teachers who break copyright law so callously can hardly ask their students to do otherwise.

Both students and teachers have told me of school computers that became virtual mimeograph machines for any software that students wanted to bring in. One teacher's attitude was, "You can copy it as long as I get a copy."

Many students see nothing

wrong with computer crime, and no one has ever taken the time to explain the possible consequences of their activities. They justify stealing software because of its high cost (is that justification for stealing a car?) without realizing that their theft is simply adding to the cost of future software. Software protection schemes often take more programming effort than the programs they protect, and thereby raise the price of software considerably. They also keep honest users from legally backing up their software.

More important, software companies have to charge inflated prices to make up for the sales they lose because of software pirates. Most estimates I've heard say that for each copy of a serious program purchased legally, two or three people are using pirated copies. For games, the estimates are much higher. The implication is that software prices would be considerably lower if users honestly purchased their own software.

Those who take pride in raiding business and government computers often do not

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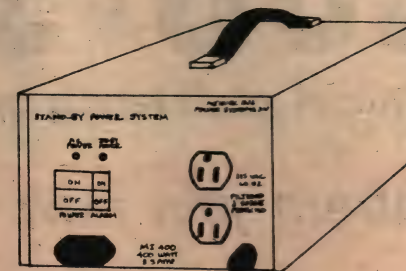
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Continued on page 16

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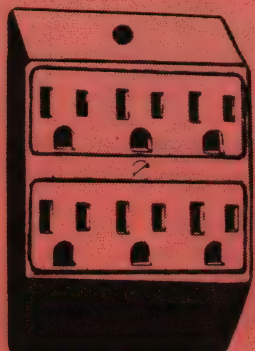
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Computer Literacy Continued from page 15

see the harm in their activities. They argue that they just enjoy gaining access and that they do no harm. They don't recognize that they are stealing valuable computer time and that they can often destroy thousands of dollars worth of data accidentally, even if they have no malicious intent. A recent estimate by the American Bar Association places the loss to business because of computer crime in the range of \$1 billion per year.

Schools have a responsibility to include discussion of computer crime in their computer literacy and computer science classes. They are training the microcomputer users who will be the next wave of either good computer citizens or computer criminals. They also have both a legal and moral responsibility to insure that no software piracy, by either staff or students, occurs on campus.

At the high school where I teach, for example, we enforce a simple policy: we will erase both the original and copy disks if we find anyone using our equipment for copying. To do any less, it seems to me, puts the school in the position of abetting criminals and opens the school to possible lawsuits by software companies.

Twenty-five states now have laws dealing with computer crime; 14 others are considering such legislation. As I write this, the House Judiciary Committee has approved a bill making computer theft and trespass a federal offense. The computer industry is also responding to the problem: four of the largest software manufacturers in the country have recently begun a \$500,000 project to stem the tide of software piracy.

Too often computer crime laws are written by people with little or no computer experience. The danger lies not in realistic laws but in over-reaction from those who cannot tell an honest computer user from a thief. There has been talk in some state capitals of banning home use of modems or taxing them into oblivion, an action that would

Continued on page 20

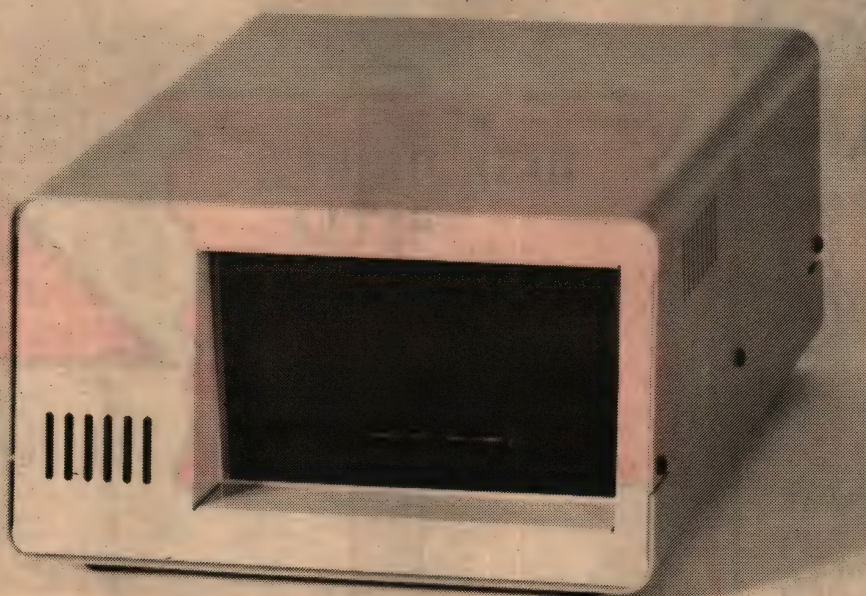
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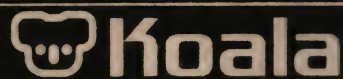
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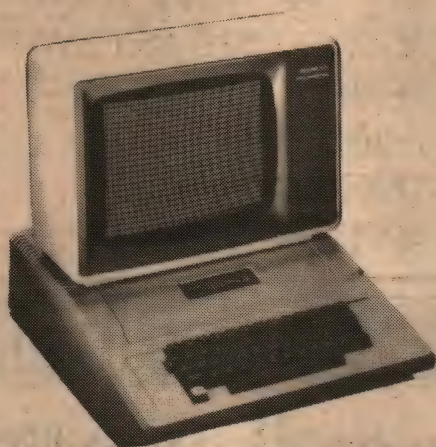
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Computer Literacy

Continued from page 16

penalize everyone interested in telecommunications.

The most encouraging sign is that honest computer users are also beginning to act. Several users groups have adopted policies condemning computer crime, often excluding computer criminals from membership and reporting their ac-

tivities to software publishers and other authorities. And a national group has been formed to work for the preservation of computing as a hobby. Its name is CHART (Computer Hobbyists Against Raiders and Thieves, P.O. Box 97276, Pittsburgh, PA 15229), and its members are concerned both about stopping criminals and changing the attitudes of

reporters and editors who seem to condone computer crime.

I believe that a majority of computer users are honest. But without concerted effort by those who are, and by those who teach new computerists, we are in danger of being overrun by the criminals among us. If that were to happen, it would destroy the hobby that so many of us love.

DISK DRIVE MANUAL

Disk drives **MUST** be periodically cleaned and lubricated. Disk drive malfunction due to lack of timely maintenance and/or repair can be extremely costly - loss of irreplaceable programs, data and text - and down time. Professional drive shops are expensive hassles to deal with, and can keep YOU out of business for weeks!! Shipping drives is risky. Most repairs and maintenances can be made in situ by YOU in much less time than it takes to remove, pack, ship, receive, unpack, install, and re-configure drives sent to drive shops. **DISK DRIVE MANUAL** (new edition) describes:

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The AT&T 6300 Personal Computer

BY STAN VEIT

With the battle cry of "Watson, Watch Us Now!" AT&T has joined the battle for the personal computer business market. Their entry called the PC-6300 was designed by AT&T in conjunction with Olivetti, who is a partner in the venture and who will produce the computer in Italy.

The AT&T PC-6300 uses the Intel 8086-2, 16-bit CPU for operation at a clock speed of 8MHz. This processor uses the

same instruction set as the 8088 used in the IBM PC and many of its clones. However, it uses a 16-bit external data bus whereas the 8088 uses a 8-bit external data bus. The clock speed of the 8086-2 is 8MHz and can execute software 30 to 80 percent faster than the IBM PC. This directly effects such things as number crunching, graphic update and spreadsheet recalculation. The main circuit board has provisions for

the mounting of the 8087 math co-processor for additional processing speed. Olivetti/AT&T chose the older 8086 chip rather than the latest members of the 16-bit Intel family such as the 80186 which powers the Tandy 2000, or the 80286 which is supposed to be used in the forthcoming IBM PC III.

The PC-6300 has 7 slots which accept IBM PC compatible expansion cards even though they are designed for

an 8-bit data bus. Three of the slots will also accept true 16-bit expansion cards designed for the "AT&T Bus". The use of 16-bit wide memory cards in these slots will greatly enhance the operation of the system in such applications as high speed network operation and graphic update needed for animation.

The main circuit board of the AT&T PC-6300 contains

Continued on page 22

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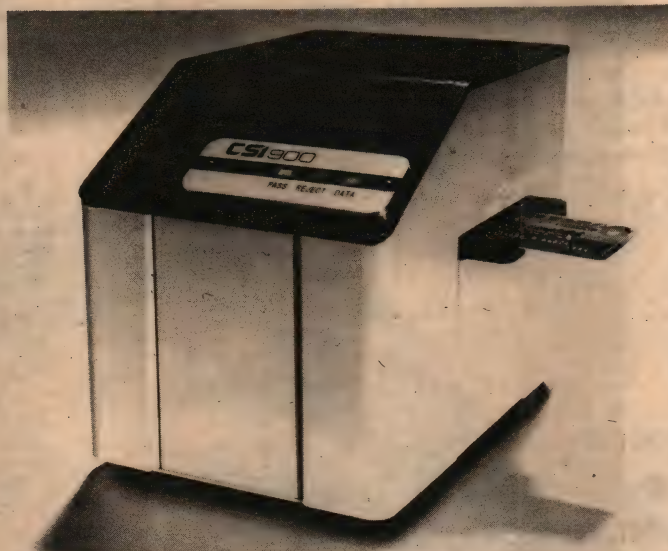
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AT&T Join PC Battle Continued from page 21

128 Kbytes of RAM, the video display circuits, the floppy disk controller, one serial RS-232C port and one Centronics type parallel port. It also contains a clock/calendar. Expansion memory can be added by plugging-in memory chips up to 640 Kbytes. Even with this expansion you still have all seven slots available for future expansion.

The keyboard is similar to the IBM PC except that it has LED's mounted in the Caps Lock and Num Lock a very desirable feature. The keys have an excellent feel and the board has tilt adjustment. As an indication of things-to-come there is a connector on the rear of the keyboard to plug-in a Mouse.

The system comes with an excellent monochrome, green video monitor. A color monitor is optional and only requires a separate cable. The color circuits are equivalent to the IBM Color Graphics Adapter, but they are already in the machine. Monochrome graphics have a resolution of 640 by 400 while color resolution is 320 by 200 with 16 colors available. An optional proprietary graphics adapter will provide for high resolution graphics for both monochrome and color of 640 by 400. This optional adapter will also permit simultaneous display of graphics and text.

The alphanumeric display is 80 columns by 16 lines and the character font is a 8 by 16 dot matrix. Reverse, underline, blinking and high intensity characters are available.

The CRT is mounted on a base that permits both swivel and tilt for viewing ease. This is a feature that costs extra on most other systems.

The form factor of the PC-6300 is small and very attractive. It is only 15" wide by 16 1/2" deep and 6" high giving it one of the smallest footprints of any of the PCs. The system unit is equipped with a green power-on light and a hardware reset button that provides a complete power-up execution of the system diagnostics. The lack of such a reset in the IBM

PC is often thought of as one of the system's defects.

The PC-6300 comes with one 360K floppy disk with a second drive as an option. There is also a model with one floppy disk drive and a 10Mbyte hard disk. The installation of the hard disk in the HD model uses one of the expansion slots, making the total 6 slots in place of 7.

AT&T has provided a choice of operating systems for the PC-6300. It can run under MSDOS, PCDOS and Concurrent CP/M-86. Given the fact that this is an AT&T product, the software publishers are all porting their products to this machine. It can run such standards as dBase II, Friday! WordStar/etc., Microsoft Word, Multiplan, DRI Draw, Sorcim, SuperCalc3, BPS Overhead Express, AST-SNA, Lotus 1-2-3 and all of the Digital Research and Microsoft languages. With this head start it will not be long before the list of compatible software is as large as that of the other PC machines.

Since AT&T is in the communication business first and foremost, you would expect their PC to be equipped with the latest and greatest in networking and communications capabilities. You will not be disappointed in the PC-6300. There are several network systems available. First is ISN, the Information Systems Network. This is more than just a Local Area Network, it can serve a wide group of computers, terminals, peripherals and host computers over an area as wide as a complete college campus. The system has a bandwidth of 8.64 Mbps and it uses a combination of twisted copper wire and optical fibers. It has a packet switching architecture to keep it completely free of packet collisions which could cause it to lose data. This system is priced in the range of \$400 to \$500 per connection making it practical for both schools and businesses.

In addition for office applications, AT&T has provided the PC Interface software package. This system permits a PC running MSDOS to share files that are resident on a 32B/300 running UNIX System V. The files are determined and organized by the 32B/300 yet users of the PC will view those files as native to the PC. This is managed because the PC Interface software resides on both the PC and the 32B. Thus the PC appears as a terminal to the minicomputer. The PC user does not leave MSDOS to gain access to the 3B2. The user simply issues the usual system calls by using a set

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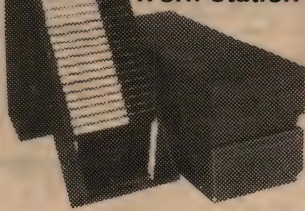
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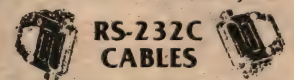
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At the same time as the PC announcement, AT&T introduced a family of dot matrix and daisy-wheel printers to support the computers. The

470 Series Dot Matrix Printers are 120 CPS Dot Matrix Printers in the \$700 price range. The 455 Series are Daisy Wheel printers with speeds of 45 to 55 CPS. They are in the \$1495 to \$1995 price range. There is nothing unusual about the printers, but they represent AT&T's desire to present a

complete system line.

The AT&T pricing was supposed to be at least 5% lower than comparative IBM PC models, with a price of \$2795 for the single disk unit, with the monochrome CRT. However, IBM has engaged in a recent round of price cutting and it is hard to calculate the price differences since IBM prices are based upon a unit that requires options to make it equal to the standard AT&T machine. IBM also gives you 256K of RAM on the main board while AT&T only offers

128K as standard. In one way this "Empty Box" pricing by IBM is attractive to customers who can then configure their systems to their requirements. In any event, it is very hard to make direct cost comparisons except on a complete system basis.

AT&T is challenging the industry in the retail arena as well as in the field of technical development. For the first time they will market a product through the independent computer specialty retailers. ComputerLand, Sears Business Centers, Microage, CompuShop, the Genra Group and AmeriSource will be the first to carry the PC-6300, in fact the machines are in 250 selected stores right now. AT&T will offer complete dealer support for both selling and servicing their machines. As yet no mail order dealers have been authorized. The initial list of dealers will be expanded as more machines become available. Interestingly enough, none of the AT&T retail outlets who sell communications equipment are slated to sell the company's computers.

In all respects the PC-6300 appeared to be an excellent PC. However, that is not the thing that makes any PC successful. The important thing is the level of support given by both hardware and software third party vendors and how well the system is sold in the stores and OEM system houses. The communications giant has a lot to learn about marketing. At the introduction meeting for the press, their representatives did not seem to know too much about their machines. They were just learning. The press is used to this kind of thing, but they had better learn fast. In addition, the press who went to some trouble and travel to get to the introduction sites was most unhappy to see their story break in a monthly magazine (of All Places!) before they had it on the wire. When IBM has an announcement, nobody gets the information in advance, nobody! As an editor I have cursed this policy, now I see why it is needed.

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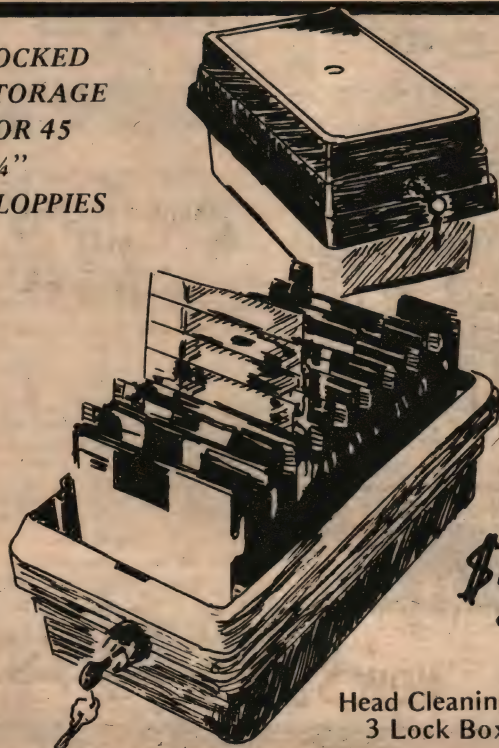
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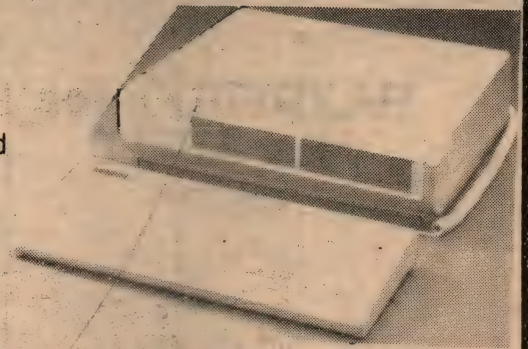
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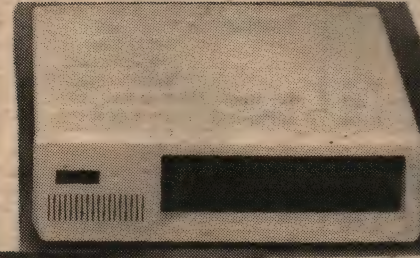
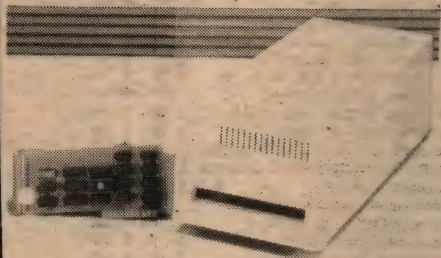
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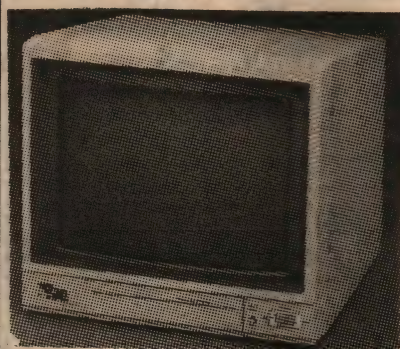
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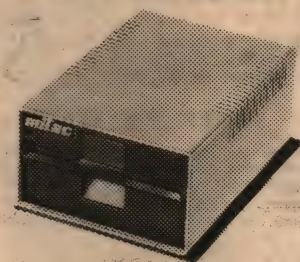
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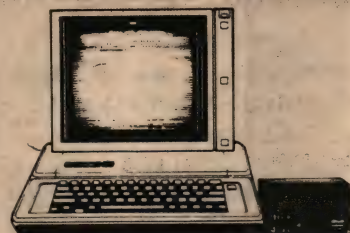
	LIST PRICE	OUR PRICE
* A2 143K Disk Drive	\$345	\$219
* A2 Controller Card	\$100	\$79
* A40, 160K, Drive	\$449	\$299
* A70, 286K, Drive	\$599	\$299
* A40/A70 Controller	\$100	\$79

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TEAC, T4Q, Direct Drive, 163K	\$349	\$239
TEAC, T8Q, Double Sided, 326K	\$449	\$329
1/2 HIGH Controller Card by ComX	\$110	\$49

	LIST PRICE	OUR PRICE
Rana Elite 1, 163K, 40 Track	\$379	\$239
Elite 2, 326K, 80 Track	\$649	\$389
Elite 3, 652K, 160 Track	\$849	\$499
Elite Controller	\$145	\$89

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	LIST PRICE	OUR PRICE
* ComX, 80 col. + 64K RAM, for Iie, 1 Yr. Wty	\$199	\$99
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* MicroSoft, RAM Card (II+)	\$16K	\$100
* Titan/Saturn RAM Card (II+)	\$32K	\$249
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* Expand 64K Gold Cd.	\$325	\$239
* Eastside, Wild Card (copier, II+ only) SPL	\$110	\$59
* Wild Card 2 (copier, + or e)	\$140	\$99
* KENSINGTON, System Saver	\$90	\$65
* Modem (Mac)	\$140	\$109
* Surge Suppressor (Mac)	\$50	\$39
* Starter Pak (Mac)	\$90	\$64
* Key Tronic, KB200 keyboard (II+)	\$298	\$219
* Koala, Touch Tablet w/Micro Illustrator	\$125	\$85
* Kraft, Joystick (Ap II/II+)	\$65	\$49
* Paddle (Ap II/II+)	\$50	\$39
* M&R, Sup R fan (+ or e)	\$50	\$30
* Microsoft, 280 Softcard (+ or e)	\$345	\$235
* 280 Softcard Plus (+ or e)	\$695	\$465
* 280 Softcard Premium (Iie)	\$395	\$275
* Orange Micro, Grappler Plus (+ or e)	\$149	\$119
* 16K Buffer Board for Grappler Plus	\$175	\$119
* Buffered Grappler Plus, 16K	\$239	\$179
* Paymar, Lower Case Chip, Rev. 7 (II+)	\$50	\$39
* PCPI, Applicard, 14 features 6Mhz	\$375	\$275
* RH Electronics, Super Fan II	\$75	\$59
* Titan/Saturn, Accelerator II	\$599	\$399
* Transend/SSM, AIOH, Serial/Para I/F	\$225	\$169
* TG Products, Game Paddles (II+)	\$40	\$29
* Joystick (II+)	\$60	\$45
* Videx, PSIO I/F Card	\$229	\$169
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Friday (Requires CP/M 80)	\$295	\$199
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* Business Solutions, Jack 2 (Ile) NEW	\$395	\$265
Incredible Jack NEW	\$129	\$89
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Market Manager	\$300	\$195
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* Howard Soft, Tax Preparer, 1984	\$250	\$185
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Series 40 GL & AR & AP, all 3	\$395	\$239
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* Quark, Word Juggler & Lexicheck (Ile)	\$189	\$129
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100 ea, DS/DD, 40 Track (IBM, H/P)	\$239	
1000 ea, DS/DD, 40 Track (IBM, H/P)	\$1995	
10 ea, DS/DD, 40 Track (IBM-PC Pre-formatted) NEW	\$34	
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10 ea DS/DD, 40T (IBM, H/P)	\$75	\$32
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MAXELL, 10 each, MD1, SS/DD	\$55	\$24
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HAYES, IBM-PC Smartmodem 1200B	\$599	\$419
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Microcommod 100 (S-100 bus)	\$399	\$275
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Stack Smartmodem 300 (RS-232)	\$289	\$225
Smartmodem 1200 (RS-232)	\$699	\$535
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Quadchrome II, 14" RGB Color	NEW	\$650
Amberchrome, 12" Amber	NEW	\$250
ZENITH, 12" Green, ZVM123	\$200	\$89
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TALLY, 160L, 80 col, 160cps	\$798	\$568
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OKIDATA, 80, 80 col, 80 cps, para	SPL \$259	LOW!
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Microfazer, w/ Copy, PP, 64K, #MP64 w/PS	\$299	\$229
Microfazer, w/ Copy, PP, 128K, w/PS	\$375	\$345
Microfazer, Snap-on, 8K, PP, Epson w/PS	\$169	\$129
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	MegaPlus II, 256K, S/P/CC	\$695	\$595
	256K MegaPlus II Expander	\$395	\$295
	SixPakPlus, 64K, S/P/CC +S/W	\$395	\$265
	SixPakPlus, 256K, S/P/CC +S/W	\$695	\$495
	SixPakPlus, 384K, S/P/CC +S/W	\$895	\$595
	Game Port for SixPak	\$50	\$39
	I/O Plus II, S/P/CC	\$215	\$150
	I/O Plus II, S/P/CC/G	\$265	\$185
	I/O Plus II, 25/P/CC/G	\$315	\$215
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	PCNet, Starter Kit, PC002	\$1095	
	PCNet, Circuit Board, PC001	\$495	
*CCS	SuperVision, 132 col., mono. board	\$799	\$399
	Graphics Adapter for Supervision	\$250	\$99
Chalkboard,	Power Pad (Requires Kit)	\$100	\$73
	Chalkboard Starter Kit	\$50	\$34
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	KB5151 jr. keyboard	NEW	\$255
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	Programmer's Guide	\$15	\$14
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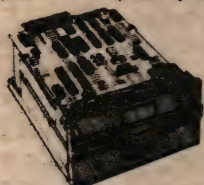
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Morrow Tricep, New Supermicro

A multi-user "supermicro" computer that for the first time brings the cost per user in the UNIX environment under \$2,500, has been introduced by Morrow, Inc., maker of small business systems.

Morrow's Tricep, which supports 4-8 users running the UNIX* System V operating system on the 16/32-bit MC68000 microprocessor, is priced starting at less than \$9,000 retail, and less than \$5,500 in OEM quantities. It will be available in August 1984.

In addition, optional slave processor boards based on the

80188 CPU and running the MS-DOS operating system will be added in September, significantly broadening Tricep's application base.

Tricep hardware includes an MC68000 CPU running at up to 10MHz, with an on-board MC68451 memory-management unit; 512 KB of main memory (expandable to 2MB); an I/O controller with 4 RS232C serial ports (expandable to 8 ports); a Centronics-compatible parallel printer port; hard- and floppy-disk DMA controllers; and 80188-based slave processors with 128 or 512 KB of on-board dual-port RAM. All boards plug into the 14-slot IEEE-696 (S-100) bus backplane.

Mass storage includes one to four 16- or 32-MB 5-1/4-inch Winchester disk drives (for maximum 128 MB storage); an optional 5-MB removable hard-disk cartridge drive; one to four 400-KB 5-1/4-inch floppy-disk drives; and one to four optional 1.3-MB 8-inch floppies.

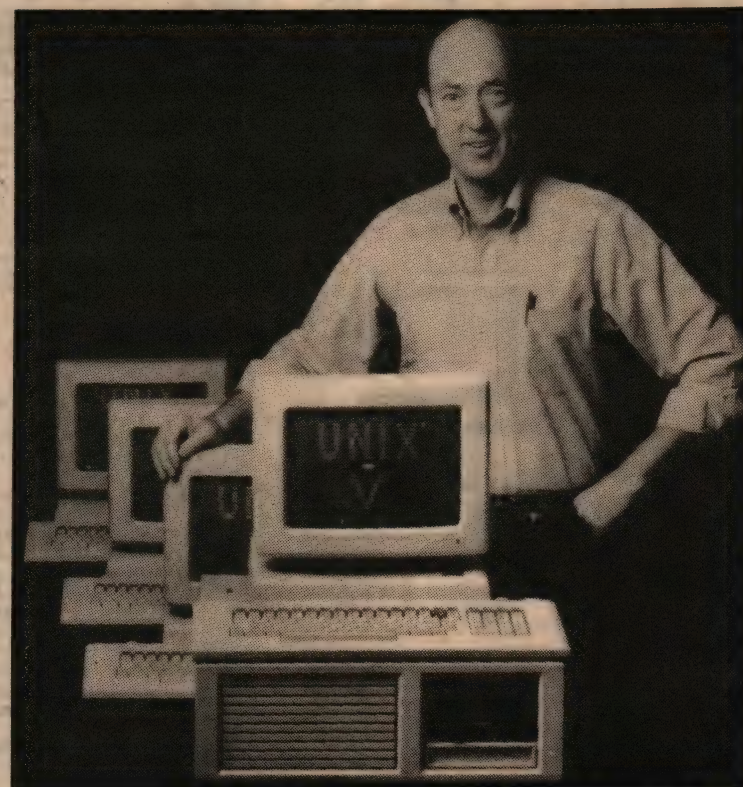
Tricep's UNIX System V sub-licensed from Unisoft Systems of Berkeley, is fully

compatible with Bell Labs' UNIX System V. In addition, Unisoft, has optimized for the 68000 chip, and has added such enhancements as record-locking and IEEE floating-point capability. A C compiler comes with the system. Other available languages include: BASIC, COBOL, FORTRAN 77, Ada and Pascal.

Morrow specifically designed Tricep hardware to maximize UNIX performance. They have implemented a powerful three-point DMA architecture that allows all three intelligent controllers (I/O, hard and floppy disk) to address areas of main memory directly through the bus.

Tricep's serial I/O controller communicates with terminals and printers at rates of up to 19.2K baud. The unit's hard-disk controller features a seek time of 85 milliseconds with the standard 16-MB drive, or 35-45 mS with the optional 34-MB drive; data-transfer rates are up to 625 KB per second.

Morrow says that they selected the UNIX operating system for the Tricep, because of its value as a standard for multi-user computers. "It's been estimated that by 1985 there will be more than 100,000 UNIX-based micros installed. Already some 500 third-party software packages are available for UNIX from more than 80 vendors, including over 20 utilities, such as menus and graphics, to improve the user interface," said a Morrow spokesman.



George Morrow Introduces New Supermicro System

UNIX System V, he added, offers a 15-20 percent performance improvement over the earlier System III.

Tricep's 80188-based MS-DOS-compatible slave processor boards are designed to relieve the main CPU of application tasks and to further expand the system's application base to the wide range of available MS-DOS software. Each slave provides a local environment with its own CPU, I/O, and up to 512 KB of dual-port RAM that is directly accessible by any component residing on the bus. The main 68000 CPU loads tasks into the slave's memory to be executed

by the 80188 processor. Thus up to 80 percent of the application-level work can be offloaded from the 68000, in a manner completely transparent to the user.

Slave processor boards will be priced at less than \$700 each.

Future enhancements to Tricep will include boards providing Ethernet local-area network support and PC graphics capability.

For further information contact: Morrow, Inc., 600 McCormick St., San Leandro, CA 94577, (415) 430-1970.

Mention that you read about it in the Computer Shopper. ●

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Getting Started With A Computer

Part IV

by Cheryl Peterson

Some computers come with so many standard features, there's very little left to add. Others have so few features built in that everything has to be added. This makes it very difficult to really define peripherals and accessories.

For instance, most of the transportables (Osborne, Compaq, Gavilan, Kaypro, IBM) have built in monitors, disk drives and 64 or 128k of random access memory (RAM). If the small size screen bothers the user a separate larger monitor can be bought as a peripheral. Modems, printers and hard disk drives are commonly offered accessories for these machines.

On the other hand, the TRS-80 Model 100 comes with a small LCD display and a built in modem. A disk drive and video interface can be purchased as peripherals. Printers are also available that will work with the Model 100. The standard unit comes with 8k of RAM. This can be expanded to 32k by buying memory modules.

The NEC 8201A comes with 32k of memory, but no modem. One can be purchased as an accessory and, of course, a variety of printers will work with it.

The newly announced HP Portable comes with a built in modem, LCD display and 272k of RAM. At the moment, HP is offering a printer and a 3 1/2" floppy disk drive as peripherals.

The Commodore 64 has a keyboard. Period. Optional accessories for it include monitors, disk drives, modems, printers, joysticks, trackballs, light pens and drawing pads and a few other exceptional items (like a module that lets the 64 talk or one to let it listen to spoken commands). There are even musical keyboards for entering songs.

I won't go into every system available. This is just a sampling to show the variety of configurations computers come in. As you can see, what is stan-

dard on one machine can be clearly a peripheral on another. The only way to cover them all is to define everything but the keyboard and processor as peripherals. So, in this installment of the series I'll try to hit them all: printers, modems, monitors, disk drives, games' attachments, and alternate input devices. Since things are already complicated enough, let's not consider software as a peripheral.

First, though, I'd like to make a few generic comments about peripherals. Specifically, buying them. There is no truer realm for the expression "A fool and his money are soon parted!" than computer stores. I highly recommend doing your research before walking into the store. Be just as careful about buying peripherals as you are/were about buying a computer. They can quickly eat up your pocketbook.

I would also recommend buying only one or two additions at a time. It usually takes several weeks to become truly conversant with a peripheral (barring joysticks and trackballs, they take ten minutes).

If you can find someone else who has recently bought the type of accessory you are interested in, see if you can get them to show you how it works. This is one area where users groups are especially helpful. Of course, offer to give others some help in an area

where you are gifted. For instance, you may be familiar with how to use a modem, while another user who is familiar with printer operations is struggling with his new modem. Trade knowledge.

One nice thing about users groups is that helping others can pay off later. My husband and I got one member of our local group started using a modem. He promptly formed a special interest group which held meetings at his home. At one meeting, he demonstrated how to get around on CompuServe and introduced us to the CB simulator (one of the most enjoyable pastimes on CIS). He also told us about a special on-line meeting held on Sundays, just for Osborne users. Helping others out is seldom unrewarded. If nothing else, it makes you feel good about yourself.

By the same token, don't be afraid to ask for assistance or opinions. One thing most people will freely hand out is their opinion. They will also be more than happy to tell you their sad tales of calamity with whatever equipment they have owned. Pay close attention. You could save yourself a lot of hassle, not to mention money.

One important form of research is magazine articles. Especially look for comparison articles with buyer's guides. These will usually have a fairly representative listing of the products on the market.

Although the prices will be a couple months old, they are usually good for comparisons. The most expensive items will probably still be more expensive than the other items, although the costs of all the items will probably have dropped some. Use the feature comparison charts to find the product that is most cost effective for you. Don't buy features you don't need unless the overall cost justifies it.

For instance, if a modem costs a few dollars more because it comes with a good software package, get it. If the same modem costs a lot more because it comes with a tolerable software package, pass on it. Look for a slightly more expensive modem with a good software package. Or a cheap modem with no software, if you have a source for good inexpensive modem software.

There's no way I could go into every product on the market for even one of these types of peripherals. What I can do is mention most of the salient points you should be familiar with before you buy. So here goes.

Let's stick with modems. The word modem is a contraction for modulator/demodulator. It takes a computer message and encodes it using high frequency sound waves. It also takes incoming messages that are sound waves and decodes them into computer bits. This

allows messages to be sent over phone lines.

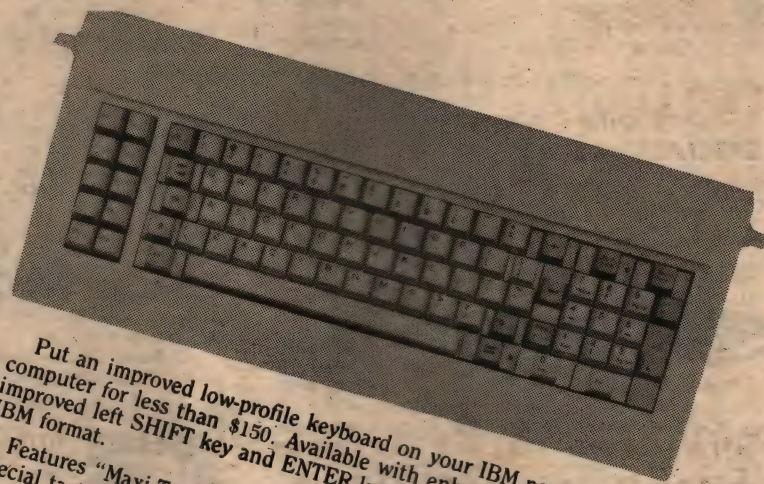
A modem is only as good as the software it works with. A very basic software package will take the information from the phone and throw it up on the screen, so that it can be viewed. It will take input from your keyboard and send it out over the phone lines. And that's about it.

A good software package will dial the phone number to connect with the other computer (auto-dial), answer the phone if it rings (auto-answer), write the incoming information to a storage device—either tape or disk (download capability), read a file from storage and send it out (upload capability), and allow you to change the communications parameters. Being able to change these parameters can mean the difference between successful data transfer and getting cut off before you even get started.

Computers can communicate in a variety of dialects, just as they can be programmed in a number of languages. The most commonly used dialect for computers using modems is ASCII. Since computers only understand ones and zeroes, it was necessary to find a way to represent the alphabet using binary codes. The ASCII code

Continued on page 30

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Getting Started Continued from page 29

set uses a different seven bit code for each character of the alphabet. Because it was

originally developed for use with a teletype-like printer, ASCII also has a few extra codes built in, for instance a break transmission key.

Using ASCII is fine for transferring text. Computer programs do not limit themselves to seven bits, however. Because computer programs usually use hexadecimal numbers (base 16), they need eight bits to represent all the possible combinations they may need to transmit. This means that a software package that can only transmit and accept seven bit data will not be able to

upload or download programs, only text.

There are many programs for the Commodore 64 that are just this way. There are probably similar programs for most computers. If the user only wants to send text to local bulletin boards, this is no problem. It would be silly to pay upwards of a hundred dollars for a more complicated program, if this is all you want to do.

I have one suggestion for people who are just considering getting one out of curiosity. Don't buy a \$300 special with all kinds of complicated

software. Get a cheap one with a fairly nice program. It shouldn't run you more than a hundred dollars. Learn how to use it; find out what it can do. Then if you want an expensive one, get it.

Almost immediately a salesperson will say "This is a 1200 baud modem. It is much better than the 300 baud modem because you can get information much faster. It's worth the extra \$200." To quote an old friend, "It ain't necessarily so."

Most people can't read faster than 300 baud. The data comes across at just about the average person's reading level. You can comfortably keep up with the messages as they scroll by. This doesn't mean there isn't a reason to get a 1200 baud modem.

If you plan to transfer larger amounts of data and then reread it at your leisure, 1200 baud can be a time saver.

Another factor here is where the information is coming from. Many information services, the Source and CompuServe for example, offer a special rate for 1200 baud. It is approximately twice the price of 300 baud, even though the information comes at four times the speed.

When downloading programs from bulletin boards that are far away, 1200 baud can save a great deal on long distance phone bills, as well. There are some disadvantages to 1200 baud. Because the data is coming faster, it is more prone to transmission errors. This means that an error checking routine is critical. Programs with error checking routines can be more expensive because they require retransmission of the suspect information. I've found that 300 baud rarely needs retransmission. So, in some cases, 1200 baud is a wise investment, but for most uses 300 is sufficient. 300 baud is certainly more tolerant of new user inexperience.

Be sure the modem you're thinking about buying will work with your computer. The inexpensive cartridge type modems for the Commodore 64 won't work with any other computer that I know of. Since the Commodore doesn't have standard connectors, many modems made to work with other computers won't work with it. This can be true of any computer. Check before you buy.

Many modems connect to a computer through an RS-232 port. This is great if you have one. If you don't, it could be very hairy trying to get it hitched up. Many computers use the RS-232 to control a printer. This could cause difficulties, if you want to print something while on-line with another computer. Some people do this, so that they don't have to save text in a file. If the modem doesn't have a separate RS-232 port to connect a printer to, you won't be able to use this system.

It is hard to explain to new computer users why they would want a modem in the first place. I didn't see much use for one until we had it. Some of the nicest programs we have were obtained for the price of a phone call. Many good programs are available through a phone line. Especially for CP/M computers. RCP/M boards (Remote CP/M) are one great source of public domain programs. These programs are free for the taking and not to be confused with illegal software often posted on "pirate" bulletin boards.

Another nice use for modems is calling local bulletin boards and leaving messages. Here in Computer Shopper you'll find a list of privately operated BBSs. There may be some in your area. They're listed numerically by area code, so it should be easy to locate one near you. Most of them have a public message area where users can leave questions or bulletins. It isn't uncommon to see someone trying to sell their old modem or computer, so they can upgrade to a newer model.

This is a great place to find help. Many BBSers, are experienced computerists, who may be willing to help the newer folks get their wings. Try leaving a message for help, if you've really tried to figure something out and it just won't gel. I warn you, though, many of us are getting tired of hearing questions on the most elementary procedures. The most frequent complaint I hear is "They ask such stupid questions. Don't they ever read their manuals?" You aren't likely to get scathing messages back for even the stupidest questions. Most experienced users just ignore the ignorant. If you have a serious problem, most experienced BBSers will give you a hand. I seem to have run out of space for this month, so we'll concentrate on the other peripherals next time. For anyone who is interested, I can be found on Miami's Big Apple, Homestead BBS, the Notebook, Source (STB635), and CompuServe (72366,2645).

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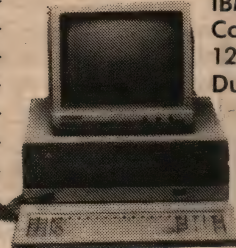
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Editorial

By Stan Viet

Is It Safe To Buy A Bargain?

People often ask me this question because I am Editor of Computer Shopper and I should know about such things. The other thing they ask me is: "When I check prices in all the computer magazines, the ones advertised in Computer Shopper are the lowest. Tell me, what's the catch?" They often do not believe me when I tell them, "No catch. They are real bargains." Of course the next question is "How come?" "Is it safe to buy bargains?"

The answer to these questions is yes and no. It depends who you are and what you are buying. The companies who advertise the low, low prices in Computer Shopper are independent, mail order operations who have very low overhead and are in a very competitive business. This benefits the buyers who are looking for the lowest prices. But they must understand what they are buying and what they are not buying. They are buying the merchandise offered with the manufacturer's limited warranty. Some dealers extend this to include the right of return if they are not satisfied, some do not. If there is a problem with the equipment the purchaser must deal with the manufacturer, not the seller. It should be pointed out that many stores work the same way. You buy a sealed carton and if there is a problem after you buy it, you deal with the manufacturer. Your discount price from the mail order vendor seldom includes the kind of hand holding that is offered by some stores.

Another factor is timely delivery. In a store you see

something, buy it and take it home. In some cases there might be a short delay for a special order, or for a new item not yet delivered. Again, you are paying for this availability. It is part of the store's overhead. When you are buying mail order, the item may, or may not be in stock. If it is, most dealers ship promptly. If not you may be in for a wait.

In order to sell at low prices, dealers must buy in fairly large quantities to get the manufacturers quantity discounts. If an item is out of stock, the dealer may wait until orders pile up to a point where they meet the quantity discount level. Also, the manufacturer may be out of stock. In some cases the dealer buys from an importer, or is an importer. If a shipment is coming by a slow boat from Japan or Hong Kong, there is nothing to do but wait. The U.S. Government has strict laws about this situation. If the vendor can not ship within 30 days, he must write you and tell you when you will get your merchandise. In addition, he must offer you your money back if you decide not to wait. This magazine also has a Customer Service Representative who may be able to help you with vendors who advertise with us. However, it is up to you to be an intelligent buyer. Call the vendor to find out when they can ship your merchandise before you buy. If one vendor can't supply it on time, another might have it in stock. This might take more than one phone call, but it is worth it when you need something. Recently, I had a disk drive go out of alignment and I decided to buy a spare.

I made a few calls and had my new drive within a week. I did not get it from the advertiser with the lowest price. He had sold out and was waiting for a new lot of drives. I paid a little more but still saved a great deal of money. In this case, I also saved a lot of time because the local dealer had his service department jammed up.

Last month, I talked about the problem of buying software from stores where they don't know anything about the packages they are selling. Since this is a widespread condition, why not buy mail order and save money?

The most important thing about buying by mail is to know what it is that you are buying. Reading the ads of the manufacturer is not enough. Find someone who has used the software or equipment and ask them about it. That is the best reason for going to computer clubs. Reviews in magazines or books are a big help, but there is no substitute for "ask the man who owns one."

Don't rush to be the first to buy a new product even if it seems to be just what you were waiting for--and a great

bargain. It costs so much to develop equipment or software that the pressures to release it to the market are great. This is often done before all the tests are completed. Bugs really don't show up in tests! They hide, waiting for the customer. It takes several revisions for everything to be right. Don't pay to do someone's testing.

When it comes to repair work on hardware, many manufacturers now have contracts with third party service organizations to perform this work on a national basis. It is therefore not a local store who fixes your computer, but a service organization. They don't care where you bought the equipment. They will fix it within warranty, and charge you for service after the warranty period is up. Find out how much they charge before you use them.

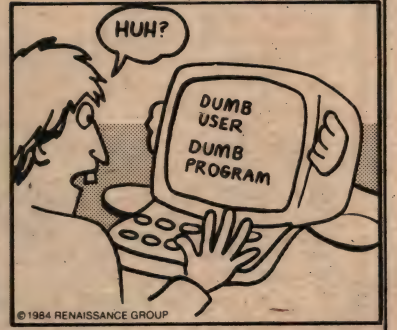
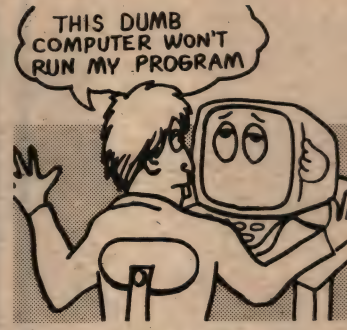
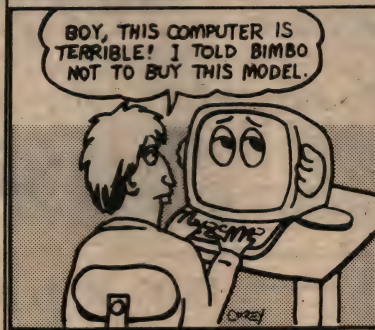
To sum it up, there are real bargains in Computer Shopper but to take advantage of them you must become an informed consumer. Know what you are buying, find out when you will get it and who will take care of any problems you have. We will help, but it is largely up to you.

The New Changes At ATARI

As we went to press, word came from Warner Communications about the sale of Atari to Jack Tremiel, the founder of Commodore. I have known Jack ever since he started in the personal computer business. I believe that the development of the low-priced personal computer was largely his doing. No one else was even thinking of selling computers at the price levels he sold his PETs and VIC-20s. He was also responsible for putting computers in many schools. Without Commodore's "buy 2 get one free" deal, elementary schools and high schools would have never been able to afford classroom computers. Without his free educational software they could never have operated their computers. He is a tough business man, but under that he is a person devoted to spreading the benefits of educational computing.

If anyone can turn Atari around, he is the man who can do it. I hope it is not too late because the Japanese are coming with MSX and those standardized machines fit right into the price range where Atari was strongest.

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by Corey Strongin

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Microcomputers Sought For Native American Schools

The Society for Information Management is asking companies to donate microcomputers for use by students at Native American schools at reservations throughout the country.

SIM's Computer Education Project was first proposed a year ago and is intended to advance computer literacy and education.

The Society requests that all equipment be packed properly and shipped post paid to The Society for Information Management, 111 East Wacker Drive, Chicago, IL. 60611.

Serving as Chair for the project is Herb Halbrecht, a past-president of SIM. Halbrecht explained the rationale for the project: "Native Americans are

perhaps the most disadvantaged and disenfranchised in the U.S., and those living on reservations are totally dependent on the Dept. of the Interior for funding and meeting their educational needs. It is, therefore, not difficult to see that their ability to provide for computer-aided instruction or computer literacy is severely limited. That's why we're reaching out to industry for what is needed. The response thus far has been gratifying -- with some companies even promising to donate professional time to train teaching staff."

For more information contact The Society for Information Management (312)644-6610.

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If you are not sure which printer to get, read the Consumer Reports, October, 83. Before you buy, shop and compare the price, service, and warranty. To compare the price, you ought to add up the cost of a printer, interface with cable, paper, tax and shipping charges. You need an interface to let your computer talk to the printer. For IBMpc, Kaypro and Osborne, all you need is a cable with right connectors. But for Apple, Atari, Commodore 64 and TI99/4A, you need an intelligent interface to do text and graphics. We have tested and evaluated almost every interface that are on the market. We found a few winners, and we offer them to you in the following printer packages. We call them Plug 'n' Play packages, because they come complete with everything you need: printer, best interface with cable, and 500 smooth edge (laser perforation) 20# paper. They work the first time you plug in and thereafter. No guesswork, no fuss. Over hundreds of satisfied customers can testify our package deals are the best in price and performance. We guarantee and service what we sell. Free shipping.

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IBM-MS DOS

Chameleon Plus, A Double Duty Clone

By Stan Veit

A Chameleon is defined as a lizard that can change color, or a changeable person. However, in the world of personal computers, a Chameleon is a portable computer that can change from a 16-bit MSDOS Computer to an 8-bit CP/M-80 Computer at the will of its owner. It may also be defined as a very good deal!

You may wonder why any owner of an IBM-compatible computer would care about running CP/M-80 when there is a huge stock of MSDOS software available. Well, for one thing there is even a larger library of CP/M-80 software and it is much cheaper. Did you ever notice that the same program costs more for MSDOS than it does for CP/M-80? It does, and the reason is they can get more money for it. In addition, there is a huge library of Public Domain Software available for CP/M-80. The Public Domain software in IBM PC format is called "P-C Blue" after the original CP/M board for the IBM PC. The Chameleon can run the P-C Blue disks without adding an extra board because the Z-80 comes built into the computer.

The Chameleon Plus we tested weighs 30 pounds. It is no lightweight, but it is possible to lug it from place-to-place by car, luggage cart or hand truck. This is no different from any of the other PC Portables of its type.

The dimensions are 18-inches wide by 15 1/2-inches deep by 8-inches high. It is built into a metal case with a handle that folds down to become a stand when the machine is in use. The front cover is removable and when it is unlatched, removed and placed on the table, there

is the keyboard. The keyboard cable (which could be longer), is plugged into a DIN connector at the rear of the case. Inside the front of the case are two floppy disks and a 9" green monochrome monitor which can display either 40 by 25, or 80 by 25 characters. The keyboard itself is of the standard IBM configuration with the exception that there are LED indicators on the CAPS LOCK and NUM LOCK keys. The keys feel a little mushy but you get used to that after a while. I'll trade the soft feel for the indicator lights any day!

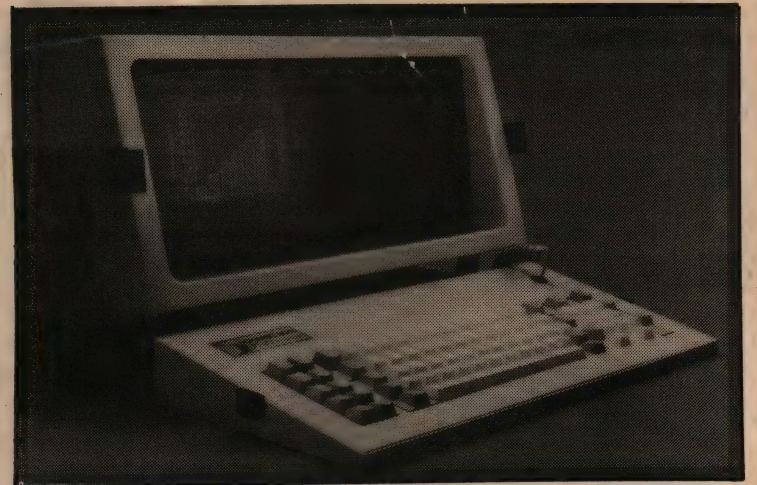
The most important question with any PC compatible is: "just how compatible is it?" The test is supposed to be running Lotus 1-2-3, Flight Simulator and WordStar. By this criteria the Chameleon passes the test. I can only say that I have a goodly stock of IBM software and I did not find anything that did not run. You have to configure Lotus 1-2-3 for black and white, but it ran fine. Oh yes, at first none of my IBM disks would run on the Chameleon, all I got was garbage. Then I realized that I had booted on MSDOS 1.8 that came with the Chameleon and I was trying to run PCDOS 2.0 disks. Dummy! When I booted PCDOS 2.0 I had no further trouble.

The software package that comes with the Chameleon Plus is worth \$2,300 at so-called "retail" prices and that alone makes the package a bargain. You get "for free", MSDOS and GWBASIC, WordStar, SuperCalc, Perfect Writer, Perfect Speller, Perfect Calc, Condor 1 (DBMS), and C Term (Communications software). I for one do not like Perfect Writer, but since you also get the Perfect Speller with it (you don't get SpellStar, or

CorrectStar) I used it. Not bad, the last time I used it was when I reviewed the Kaypro II and it had more bugs than a junk yard dog. They have cleaned it up and it's real good now.

There is a little trap door in the back of the Chameleon with a turn-fastener. When you open it, there is the power switch, the intensity control for the CRT (this is the only CRT control provided) the keyboard DIN connector, and an RCA-type video cable connection for an external color monitor. Since the video adapter circuits generate color and graphics you need no other adapter. It must be said that this also degrades the quality of the monochrome display, but you can't have everything. The only portable that displays good monochrome and color is the Compaq (IBM not excepted) and that costs a great deal more. You can live with the Chameleon display very easily. I will pick no nits.

The disk drives on the Plus unit are double sided, double



Seequa Chameleon Plus Portable Computer

density. On the standard model they are single-sided. I do not know whose drives they use but they seem to run very quietly. I have Tandons that sound like a coffee grinder, so I liked these drives.

The Chameleon Plus comes with 256 Kbytes of RAM and is expandable to 640K. The standard model comes with 128K. There are no slots on the

Chameleon but just about everything you need is provided on the main board. If you must have expansion slots, this is not your machine.

Just before we went to press, I called Chameleon to see if they had any reaction to the IBM price reductions. They sure had, the new price of the

Continued on page 34

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Chameleon Plus Continued from page 33

Chameleon is \$1595 and the Chameleon Plus is \$2095. Even at these prices you get the full software package. This is going to make people who are planning to buy a Z-80 based Kaypro for \$1295 think again. For \$300 more they can get both a MSDOS and a CP/M machine with just as good a software package.

There has to be something I don't like about the Chameleon. Well, it has one Centronics parallel printer port and one RS-232C Serial port, BUT the Centronics port has a DB 25 Connector on it instead of a Centronics 36-pin Amp connector. You need a special printer cable with a DB-25 on one end and a Centronics 36-pin connector on the other! As I have said, I like monochrome displays because I don't often do graphics, but I do a lot of text work. Any monochrome/color display is never as good as it would be with a monochrome adapter. This is a personal prejudice, others are perfectly willing to

put up with degraded text quality to get color graphics capability. The case of the Chameleon could use some good rubber feet, it scratched my desk and the plastic latches on the case are a real pain.

Outside of these few things, it seems like a big bargain. I had reports that the early models had problems in manufacture and the first one they sent me had to go back because of a defect in the keyboard, but they seem to have better quality control now. Dealers say the Chameleons are coming through with few problems these days.

If you look through this magazine you will see that low cost PC clones are not as rare as they used to be. However, the new low price of Chameleon plus the software package makes it hard to beat.

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HALO-Windows For PC

Programmers desiring to create software with multiple windows and viewports for the IBM PC, XT and PC Jr. can now do so with the release of HALO(tm) 2.0, a graphics toolbox marketed by Lifeboat Associates.

"With this new release of HALO, Media Cybernetics demonstrates again its commitment to provide easily-mastered software tools in a dependable, affordable, expandable format," commented Dr. Edward H. Currie, Lifeboat's President. "Programs we are seeing that have relied upon HALO for their graphics functions are, literally, light-years ahead of the competition."

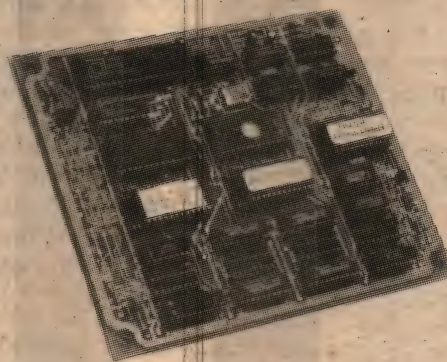
HALO is the most widely used graphics library for the IBM PC. With more than 150 functions, the system provides standardization across popular computer languages, 16-bit microcomputers and graphics boards, including PC-DOS and MS-DOS-compatible systems. It is ideal for program developers desiring to enhance the quality and marketability of their programs through easily-implemented professional level graphics.

Versions of HALO are available for PC BASIC (both interpreted and compiled), Lattice C and C86 and Microsoft C, Pascal, Fortran, and Assembler as well as APL +.

In addition to fully support-

ing for the IBM color graphic adapter, HALO is available for graphic boards from Scion (PC640), Hercules (The Graphics Card), Orchid Technology's (MGA Board), Amdek (MAI Board), Conographics (Conocolor Adapter), Tecmar (Graphics Master) and AST. Versions of HALO are also available for the Texas Instruments Professional and Compaq microcomputers. HALO 2.0, in addition to providing windows and viewports which can overlap and are rotatable, offers point, line, arc, pie, circle, ellipse functions, and hatch styles, pattern

Continued on page 36



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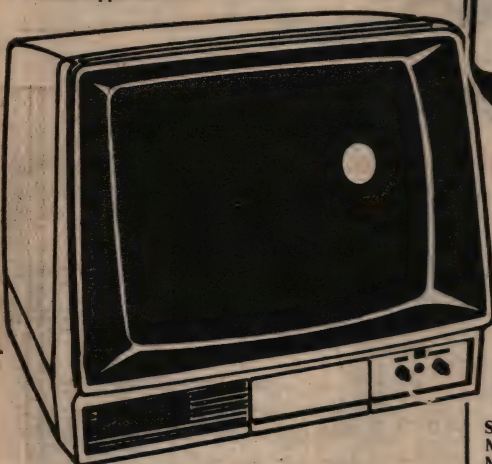
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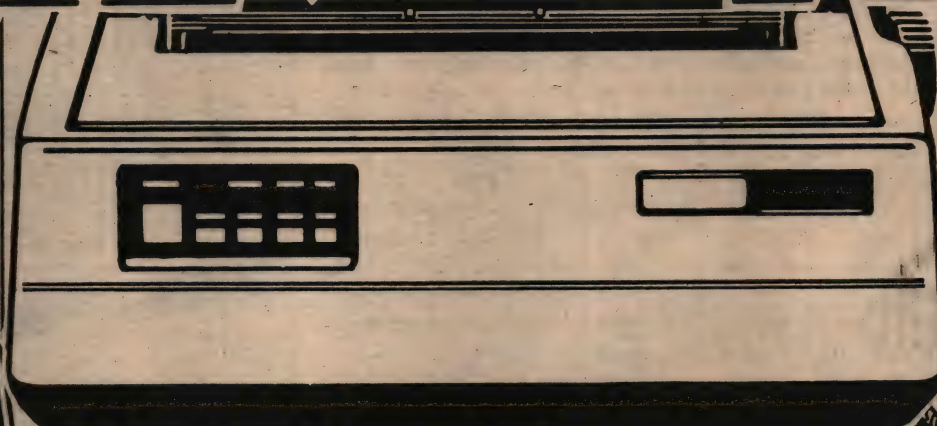
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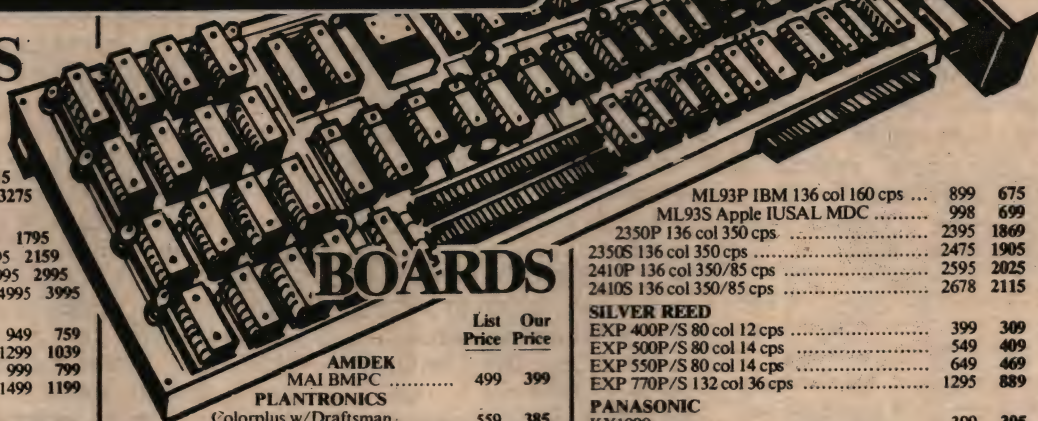
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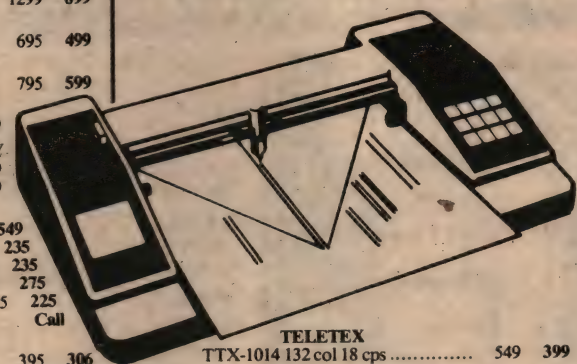


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HALO-Windows

Continued from page 34

fills, dithering, clipping, animation and image compression. Lines can be set for multiple-style and width. A rubber-band mode provides for high-speed animation and mouse-driven computer art. Panning and zooming effects are easy to create.

HALO 2.0 includes LEARN-HALO, a stand-alone graphics interpreter designed to teach use of graphics functions. LEARNHALO can now execute macro commands, which can be created with any text editor or word processing program.

"Using HALO's world coordinates, programs with graphics capabilities can be developed on any of the HALO-supported devices and transported to other HALO-compatible devices. This makes HALO, and any programs written using HALO, device independent," explained Bill Strum, creator of HALO and president of Media Cybernetics, a Takoma Park, MD. software house.

HALO also supports mice by three manufacturers: Microsoft, Mouse Systems and Summagraphics. Lifeboat also sells Media Cybernetic's Font-Pak(tm), a collection of 11 high-quality typefaces for use with programs taking advantage of the HALO graphics system.

For more information call 212-860-0300.

Mention that you read about it in the Computer Shopper. ●

Canon Introduces Two MSDOS Computers

by J. Cotton

At the 1984 NCC in Las Vegas, Canon USA introduced two MSDOS Computers as their entry into the 16-bit PC field. The first is an IBM PC-compatible that uses the 8086 16-bit CPU. It, however, can run such PC DOS programs as Lotus 1-2-3, Flight Simulator, SuperCalc III, and dBase II. The standard configuration includes the monitor, serial and parallel interfaces and 256 Kbytes of RAM.

Two slimline double density, double-sided drives with 360K capacity are included. The Canon PC runs MSDOS Version 2.1 and GW Basic 2.0, both are supplied with the computer. One version uses a 12" monochrome monitor with a green screen and either a 40, or 80 character by 25 line screen. The other version uses a 12-inch high resolution color monitor. The color resolution is 320 by 200 pixels for four color graphics, or 600 by 200 pixels in monochrome graphics.

The PC has five slots for expansion, only one is required for the monitor adapter since the I/O and disk controller functions are built on the main board. The keyboard is a standard IBM-compatible unit although somewhat lighter than the IBM keyboard.

Canon has not released the suggested list price for the new computer preferring to wait for the going prices in October

when the machines will be released. This appears to be another 'ME TOO' computer and it has no special features to recommend it. If it sells it will be the basis of price alone and since no prices was released, all we can do is report its existence.

The other Canon Desktop Computer is a very interesting machine. It is called the Canon TX-50 and it is a 8088 based MSDOS Computer designed for special stand-alone turnkey application. All necessary components are mounted within the computer case. There is a CPU, keyboard, 7" monitor and a small dot matrix printer. It comes with 128 Kbytes expandable to 256 Kbytes and it has a compact 3-inch disk with a capacity of 180 Kbytes per side. The TX-50 has two slots for expansion boards which can be used for serial or parallel expansion boards to connect to the outside world. The language of the TX-50 is BASIC and it can be programmed to run dedicated applications. The 55 keys come with LEDs that can be turned on or off. It has transparent cap covers that can be marked with legends applicable to the programs being run on the machine. Thus the machine could be used as a point-of-sale computer or ticket printing machine or some such application.



Canon TX-50 Turnkey Computer

The built-in printer prints 30-characters per line and prints on either roll or cut sheet paper, in black or red ink. The monitor is a 7" flat faced monochrome with a display capacity of 30 characters by 10 lines, 15 characters by 5 lines, or 80 characters by 25 lines.

Again no price was released for the TX-50. If the price is right we can see these little machines all over the place, in banks, real estate offices, car rental companies, in fact we see no end to their use. The price has to be low and the maintenance easy for this machine to be a success.

We do not see this use of BASIC for this machine. If it is to be used as designed, it should have capabilities for ROM based programs that can not be crashed by the user. The

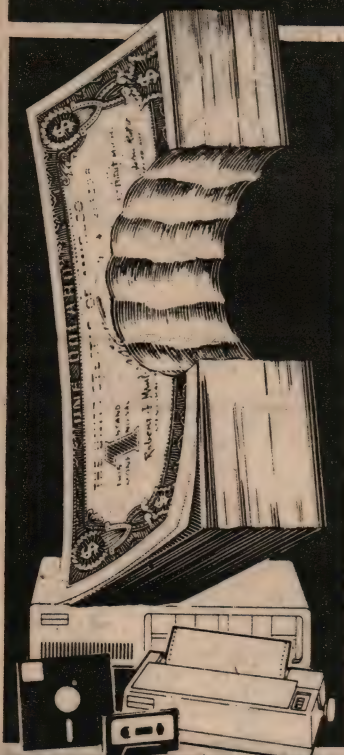
disk should only be used for the collection of data for transfer to a larger MSDOS computer. ●

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IBM Software Reviews

By Andrew Freid

System Backup- Software Assurance Protection

Several weeks ago I inserted a DOS disk into drive A and turned my computer on. I waited for the memory check, and as usual in a couple seconds the A drive came to life. But this time, instead of booting up my system, it stopped. Dead. Really Dead!

Not the type to panic, I theorized that I had inadvertently formatted over the DOS disk. Under MS-DOS, if you try to boot up without a disk or with an improperly formatted disk, it results in the same symptoms. So, I calmly put my word processing system disk in and once again tried to reboot but the same thing happened. About this time, I decided I wasn't having much fun.

As a last futile attempt, I took my Compiler Disk (Turbo Pascal, of course) and made one last ditch effort to boot the system. As before, nothing

happened. Suddenly it struck me; the disk drive had crashed! It would not be until later on in the evening that I was to discover that not only had my drive gone bad but it destroyed all three diskettes! I ran to my closet and frantically grabbed five or six library cases. On one of the disks, I had a very large Pascal source file that I had been working on for three weeks. I knew I had a backup and I wanted to see it and see it NOW.

Suddenly, I found it. I did have a backup. All that I lost was three diskettes and a pint of sweat. But what would have happened if I hadn't had backups? That's when I realized that I needed some kind of Software Assurance Policy.

My story had a semi-happy ending. I merely had to replace a drive and create additional backups of the three disks I lost. Believe me, my time spent programming the 50-page Pascal program was worth a lot more than the money it cost

me to stockpile backup copies of my programs.

Just as my source code was important to me, you may have purchased a program whose operation is critical to your business or operation. Just because the disk is write-protected doesn't mean it can't get zapped! So the obvious minimum protection you should have is, plenty of backup copies of important or irreplaceable diskettes.

What happens when you pay two or three hundred dollars for a program, only to discover the program has been copy protected? Do you do without a copy? Most software houses employing copy protection on their programs offer to replace the disks if the originals are returned. Really generous, huh! What are you supposed to do for the two to three weeks it takes for the new copy to get back to you? Can you afford to be without the program for three weeks? Chances are you aren't willing to be inconven-

ienenced like that unless you can't help it.

I'll tell you what many people do. They purchase programs that make copies of the copy protected programs. Are they protecting their investment, or violating copyright laws? This is a legal and moral question that I don't care to go into in this article. What I do want to discuss is one of the better backup type programs written by Norell Data Systems called System-Backup.

The documentation accompanying the program makes it quite clear that System-Backup requires a very specific hardware configuration in order to insure that the program will operate reliably. You will need the IBM PC or XT computer, 64K RAM (96K if using DOS 2.x), an 80 column display, at least one Tandon 100-1 or 100-2 drive, DOS 1.1, 2.0 or 2.1 and finally the original IBM disk controller card.

Operation of the program is extremely simple. The file

name is called up as any other .EXE program would be. The program will then prompt you to insert the source diskette in drive A and the target diskette into drive B (assuming you have 2 drives). You then enter return and in a matter of two or three minutes you have a perfect duplicate of the first disk. Can't get any simpler than that! The only variation to this occurs if you are using a single-disk drive. In that case, you alternate the source and target in the same drive.

It is important to note that System-Backup operates by making an exact duplicate of the diskette. Therefore, if the original disk is copy protected the backup disk will also be copy protected.

System-Backup does have several other capabilities in addition to its ability to make backups. When given the proper command, it will analyze the track and sector sizes, the

Continued on page 40

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timing between sectors, and the availability of invalid synchronization address markers on a source diskette.

Another powerful feature of System-Backup is that it will find and correct CRC (Cyclic Redundancy Check) errors. Warning: This feature should not be used unless you are sure that it won't interfere with the disk protection scheme as one form of copy protection creates these CRC errors and then tests for them. In rebuilding the sector, System-Backup will copy the data in the sector exactly as it finds it, then calculate and enter the correct CRC.

As is the case with other bit copy programs, Norell offers continuous updates as protection schemes are invented. According to documentation, there will be a version in the near future that will be able to bypass Pro-Lok disk protection.

I would like to make an im-

portant point; System-Backup and other programs like it are not developed and sold to help pirates obtain illegitimate software; they are designed to help those purchasing programs to maintain an adequate backup system. My experiences have shown the absolute need to have plenty of backups available in order to prevent disastrous results if your disk is damaged.

I would highly recommend System-Backup to anyone who purchases copy-protected software. Priced around \$50, it is an inexpensive Software Assurance Policy. For further information, contact: Norell Data Systems 3400 Wilshire Blvd. Post Office Box 70127 Los Angeles, CA 90010 (213) 257-2026

Diskette Manager-The Utility For Disk Libraries

This article is not about another word processor, spreadsheet, or database

management program! Yes, other types of software do exist despite all of the coverage the "Big Three" seem to get. There is another very broad category of programs usually referred to as Utilities, the most popular of which has become The Norton Utilities written by Peter Norton (for MS-DOS or PC-DOS).

B.P.C., or Before the IBM PC, most microcomputer software operated under a CP/M (Control Program for MicroComputers for you trivia nuts). The significance of CP/M is that a terrific base of GOOD public domain software is available, much of which consists of such classics as the yet-to-be-matched Modem 7 Series (for terminal communications) and Disk Utility and Sweep (for disk management).

One of the utilities I have used on my Osborne is called NCAT. NCAT is a disk cataloging program which allows you to take all of your disks and place the directory

information into a database. This can later be searched and the data printed out. It is, to say the least, one of the most useful utilities I have. Having well over a hundred disks, finding a specific program is somewhat difficult without it. Which brings me to the topic of this article--a Disk Cataloging Program for the PC family called Diskette Manager.

Diskette Manager is a disk utility program that catalogs your disks, prints reports concerning each disk and its contents and will even print the directory information on small mailing type labels (200 of which are supplied with the software). Minimum system requirements for operation of the program are an IBM-PC (or equal) with at least 96K of memory, an 80-column color or monochrome display, an IBM or Epson printer with Grafrax, and two double-sided drives (you are able to use single-drive systems with loss of some features).

The program comes packaged in a disk library case and includes the documentation, two hundred mailing type labels (4 x 1 7/16 inches which makes them a little larger than the standard ones most use but still easily obtainable) and two program disks, one for each major Dos Version (1.1 and 2.0).

According to the accompanying documentation, Diskette Manager is capable of cataloging up to approximately 200

disks, or 6000 file and comment entries if you are using two double-sided drives. If you have only one drive, you will not be able to produce reports or catalog the information; you will only be able to print labels and view information on the screen (in other words, the program requires two double-sided drives!).

Operation of the program is so simple that a non-technical person can easily catalog the disk in a matter of seconds. Briefly, all you need to do to catalog a disk is to install the program disk in drive A and the disk to be cataloged in drive B and press Function Key 1 (F1).

After a couple of seconds, you will be prompted for a name of the diskette. The name you assign should be unique and may consist of up to 17 characters. Only two disks may have the same name; the master and the working copy. Once you have assigned the name, you are then placed in a screen text editor which prompts you for additional information concerning the disk. These comments, along with the disk name, are saved on the disk for future reference.

When the program catalogs the disk, it creates a file on the disk which contains the Volume Name and Comments. The reports which are subse-

Continued on page 42

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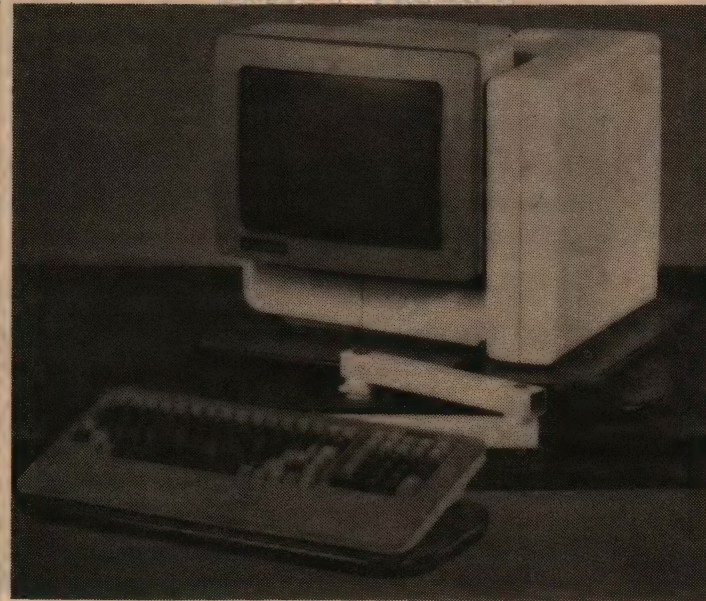
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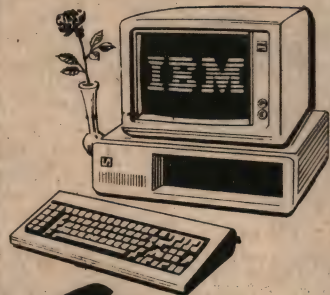
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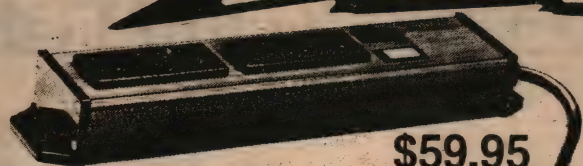
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IBM Software Reviews

Continued from page 40

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In order to printout the information, you merely enter a different sequence of Function Keys and Alternate-Function keys. You may select four types of printed reports:

Disk - This report provides all file names, dates, number of files, bytes used and bytes remaining, diskette status and whether the disk is single or double sided.

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names in four columns with a maximum number of 100 diskettes being represented on a single page.

CONCLUSION

The program, being menu driven, is easy to understand and operate. When you first get the program, you will need to spend a few minutes familiarizing yourself with the different commands--all of which consist of either a Function Key, Alternate-Function Key combination, or similar designated keys like the Insert. With the menu on the screen, commands are simple.

One serious drawback to the program is the lack of different printer configurations. Not everyone owns an Epson or IBM dot-matrix printer (myself included). Many programs get around this by using different installation routines which will customize the software for your own requirements. I was able to generate the standard reports on my Okidata printer, but the label feature choked due to the different control codes needed by each printer.

The program generates four different reports, but does not have any way of searching the database manually to locate an individual listing. The CP/M public domain program NCAT has a feature that allows you to search the entire database for any file entry (using only an ASCII string as the target). For example: you are able to request a find of .EXE; the program will retrieve all files cataloged having those characters. I have always thought of this as one of the biggest advantages of a disk cataloging program.

I contacted Lassen Software and was told that they have just released Diskette Manager II. The major enhancement in the newer version is that they added the search capability lacking in the first version.

If you keep a single program on a single disk or all related programs on one or two disks, chances are a disk catalog program will probably be of little benefit to you. For example, if all of your word processor letters are on a single disk, you could merely do a selective directory search to find a particular file. If, however, you maintain an extensive library of disks with each disk containing a variety of unrelated programs (as in the case of a collection of user group programs), a disk library program is a must.

The Diskette Manager carries a suggested retail price of \$59.95 while the newer version, Diskette Manager II, has a suggested list price of \$99.95. For further information, Lassen Software, Inc. P.O. Box 1190 Chico, California 95927 (916) 891-6957

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Softech Microsystems Announces New Educational Licensing Plans For UCSD Pascal

SofTech Microsystems has unveiled new licensing plans aimed at the educational market. These plans will offer educators at the secondary, college and university levels inexpensive alternatives for licensing UCSD Pascal®.

"SofTech Microsystems has taken the most important language to the computer science community and has priced it in an innovative way that recognizes the special needs of high schools, colleges and universities," said John W. McCredie, President of EDUCOM, a non-profit consortium of colleges and universities.

These plans offer educators a choice between two different products. The first is a Learning Environment and the second is a complete Development Environment.

The Learning Environment facilitates instruction in beginning programming courses. It includes a UCSD Pascal compiler as well as the p-System™ microcomputer operating system. The Learning Environment is available for the IBM PC and PC compatibles, and it can be purchased on a single copy basis for \$90 to \$150 depending on the number

of copies purchased. It can also be licensed, on an unlimited reproduction basis, beginning at \$795 for institutions in which at least 100 students will use the software.

The Development Environment contains all the features of the Learning Environment plus all of the capabilities of the full UCSD Pascal product. It is appropriate for Pascal instruction from beginning classes through advanced operating system architecture courses. The Development Environment enables the instructor to teach courses in a variety of assembler languages. And, this environment also facilitates the development of applications for internal classroom and administrative use.

The Development Environment is available for most popular microcomputers including machines from IBM, Apple, DEC and Zenith. It can be purchased under a variety of licensing plans, each with unlimited reproduction rights, that begin at \$2500 for institutions where 100 students are anticipated to be using the product.

In both environments, support for the first 90 days is in-

cluded. And, a FORTRAN-77 version of the products is also available.

The licensing plans for both products are based on student enrollment and the enrollment is calculated in one of the following two ways: the number of students currently declared as majors in computer science, information systems programs or similar programs in which Pascal is offered; or the average enrollment from the prior academic year in Pascal courses.

"Since these new pricing plans are based on a one time measure of student use, educational institutions are free from the copy-counting nightmare. They also pay a fixed site fee, enabling additional campuses or schools within a system to be added without costly upgrades," said Chris Trout product manager for the educational market at SofTech Microsystems.

The first release will be available in August from SofTech Microsystems' Educational Sales Department, 16885 West Bernardo Drive, San Diego, California 92127, (619)451-1230.

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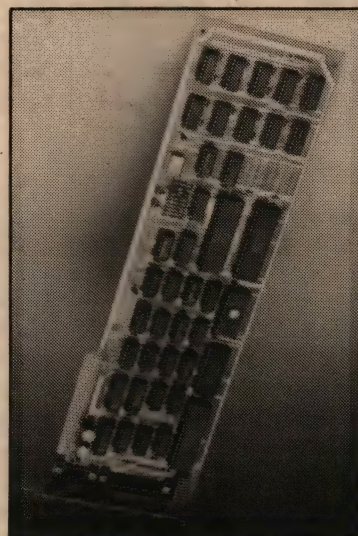
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While the IBM PC is more expensive than the company's own DMS-816™ PC-compatible workstation, available for \$1695, the HiNet/PC Adapter lets current PC owners conserve their investments while expanding the utility of their system. The HiNet/PC Adapter adds 64K RAM, a Z80 processor, RS-232 interface port and HiNet network interface to its host PC. The Z80 processor handles all network interface functions; this relieves the PC of significant amount of overhead. The

Z80 processor also allows execution of CP/M-80 programs.

As many as 63 workstations can participate on the HiNet LAN-based system, providing a per-user cost significantly less than multiple stand-alone computers. Expensive data storage devices and peripherals can be shared by all users, again reducing per-user expenses. And, of course, the company's inexpensive DMS-816 work stations offer an economical avenue for expanding the system to additional users.

HiNet can simultaneously support CP/M™, CP/M-86™ and MS-DOS™ applications. In addition to the DMS-816 (with Z80B and 8088 processors, PC-compatible monochrome video display, an enhanced PC-compatible keyboard and an emulation of the PC's ROM BIOS), Digital Microsystems offers a number of master station and user station options for HiNet systems in configurations from 15 to 184 Megabytes, plus gateways



HiNet PC Adapter to mainframe and ICL-protocol systems. And the HiNet LAN has been field proven, with more than 3,000 systems installed worldwide since 1980.

For additional information contact Digital Microsystems, 1840 Embarcadero, Oakland, CA 94606; (415)261-1034.

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New Software For The Sanyo 550 & 555 Series

THINK + PLUS Series constitutes a full library of over 30 software packages - from Counting to Calculus - designed around the principle of Computer-Aided-Instruction. The series had previously been released in CP/M and PC DOS versions, and therefore is compatible with most of the popular microcomputers.

To complete the conversion of its software programs, RSI initially developed a unique conversion program to address

the problems that arose because of the differences between the IBM Basic and the Sanyo Basic. This conversion program, named IBMTOSAN, is designed to make original software operational in both formats, and is presently being distributed to software authors.

RESOURCE SOFTWARE INTERNATIONAL specializes in providing software for personal computers. The Sanyo is simply a welcome addition to its growing list of hardware compatibility. Inquiries to the firm are invited.

For more information, contact Resource Software International Inc., 330 New Brunswick Avenue, Fords, New Jersey 08863; (201) 738-8500.

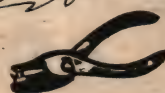
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Professional Microware To Market Legal Management Software System

Professional Microware, Inc., has developed a new time and billing software system for the IBM PC-XT and MS-DOS Compatible Microcomputers with hard disks designed to be used by small to medium-sized law firms, according to William H. Gibbs, President of PMI.

The new Legal Management System from PMI, believed to be the most comprehensive microcomputer software system ever developed for legal firms on a nationwide basis, is currently being tested in several "beta" sites and was in

July, 1984.

In addition to performing standard timekeeping and billing calculations, PMI's Legal Management System produces management reports designed to determine which clients are profitable and which attorneys are producing. It also maintains client trust accounts, ensures that docket dates and appointments are met, determines the amount of fees generated by the attorneys who bring in the business and those who perform the work, and provides a detailed open item history of all the bills and payments that make up the

client's accounts receivable balance.

Professional Microware, Inc., was formed in 1983 by William H. Gibbs, CPA, and Matthew Anticevich, both of whom were previously employed by Price Waterhouse's Management Advisory Services division, where their responsibilities included developing and installing computerized accounting systems.

PMI is headquartered at 320 East Virginia, Phoenix, AZ 85004.

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MGI Announces New CAD Program For IBM PC

A new concept in CAD programs for the IBM PC, many IBM-compatibles and the Tandy 2000 has been released by Microcomputer Graphics, Inc. The program is operated directly from the computer keyboard without accessory input devices, and is the only program to place symbols into squares of a grid on the computer screen with a single keystroke.

Claimed to be the fastest way to create schematic drawings, MGI/SCHEMATIC DRAFTER (tm) is designed for producing non-dimensional symbolic drawings such as electronic circuit diagrams,

digital logic diagrams, electrical schematics, pneumatic/hydraulic schematics, ladder diagrams, process drawings (P&ID's), space planning layouts, printed circuit board layouts and even project schedules or organization charts.

The MGI/SCHEMATIC DRAFTER (tm) is totally keyboard operated. The engineer or draftsman simply enters letter-designated symbols from the computer keyboard using a template guide, into a series of "cells" on a checkerboard pattern on the computer screen. Most of the standard MGI/Template series contain 35 to 40 individual symbols, but the system can handle 52 symbols or more if required.

Individual symbols may be rotated or mirrored to change the symbol's orientation within a cell on the computer screen. Overstrike allows for multiple symbols to be placed into a single cell, eg., a ganged switch with dotted-line overstrikes. Text can easily be added and "dragged" or rotated into position during the preparation of any schematic.

Changes to a drawing are quickly made in the appropriate cells with single

keystrokes. Because MGI/SCHEMATIC DRAFTER uses a unique cell system, entire blocks of an existing schematic may be quickly moved to allow for revisions, or saved for future use as desired.

The MGI/SCHEMATIC DRAFTER features panning across a drawing as well as the ability to zoom in and out for different views. When a drawing is completed, it can be plotted on a dot matrix printer as a draft copy, or on a conventional pen plotter for finished drawings. A unique feature of the MGI/SCHEMATIC DRAFTER is its ability to scale the finished drawing to the correct paper size without operator intervention. Drawings are stored on a floppy or hard disk for future use.

MGI/SCHEMATIC DRAFTER is priced at \$3,900 and includes a detailed User Manual, one full year of software updates and one full year of direct factory support. The package may be ordered directly from Microcomputer Graphics, Inc. 13468 Washington Boulevard, Marina del Rey, CA 90292 (213-822-5258) or purchased from local computer dealers.

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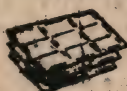
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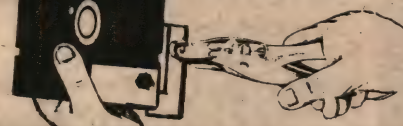
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Report Manager™ 3-D Spreadsheet

Datamension Corporation (Northbrook, IL) now offers users of their powerful three-dimensional spreadsheet software a choice of more than 250 graphics characters to help make even complex graphs and charts easier to follow. This graphically adroit 3-D spreadsheet, Report Manager®, is available for \$495. (suggested US resale) at participating Datamension dealers.

Where other popular spreadsheets offer 1, 2 or 3 graphics characters, Report Manager makes available the computer's full complement of characters (255 in the case of the IBM® Personal Computer). These can be used in chart-type graphics (including bar charts, histograms and scatter or plot charts); as alternatives to score-line markers for subtotals, totals, key entries or entire sections; or as demarcation separators, as might be used in designing questionnaires, templates and many forms not usually associated with spreadsheets.

This wide selection of characters for graphics, taken in combination with Report Manager's robust arsenal of tools for testing values and the results of calculations (including operations that determine sign, relational comparison operations, list-related operations and more), yields a system that can produce inherently understandable graphics from very complex source information. For example, specific characters or symbols can be assigned for individual salespeople or sales areas, helping untangle a complex chart or graph, even if of painstaking detail.

Report Manager also offers the option of turning off the spreadsheet grid, which can often provide a more attractive or more appropriate look to the finished report.

Once a graphic format has been determined, it can be automatically invoked using simple commands in EXEC, Report Manager's front-end

programming language. This provides an easy way to establish a standard look to report graphics without requiring that each user repeat the design exercise. With EXEC, in fact, users need only answer specified prompts; Report Manager can place these answers into their proper context and generate the finished spreadsheet, graph or report.

Report Manager is organized as 255 rows by 255 columns by 255 pages, any of which can be addressed at any time; this means that each Report Manager spreadsheet file boasts the ability to reach more than 16 million data cells (limited by disk storage space, not CPU memory). Further, Report Manager automatically adjusts its operations to fit available system RAM.

The current view of Report Manager's three-dimensional spreadsheet can be "rotated" to bring onto a single page (screen) a "crosscut" view. For example, assume a monthly product sales-by-territory report is organized with a row for each product, a column for each territory and a page for each month. A rotated view can provide a report on monthly sales for a selected product



Report Manager (R) the Original 3-D Spreadsheet, with 255 pages.

with a row for each month and a page for each product while columns maintain territorial breakouts. A different rotation can show monthly sales in a selected territory with a column for each month and a page for each territory while rows maintain the by-product breakout.

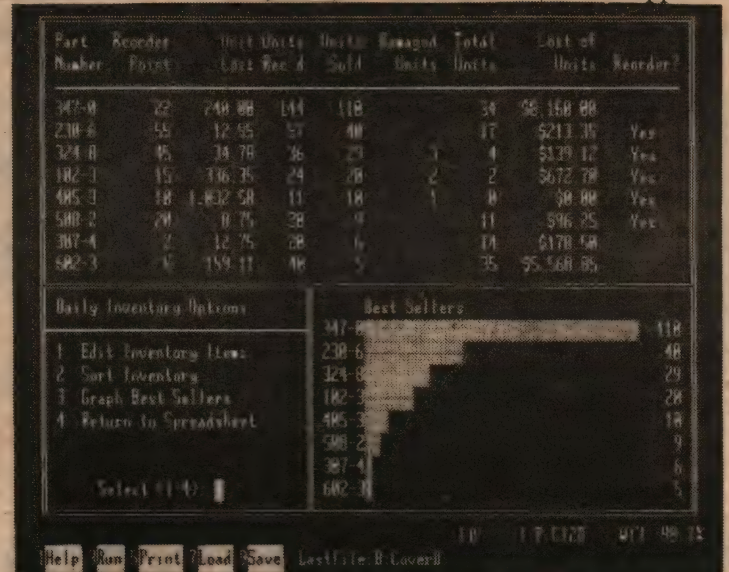
Report Manager includes Datamension's Dimension Aid™, a system of user assistance that includes an on-line help function, a training diskette and a detailed, easy to follow tutorial manual - no additional training manuals are necessary. Beginners have become comfortable with the

program in just a few hours.

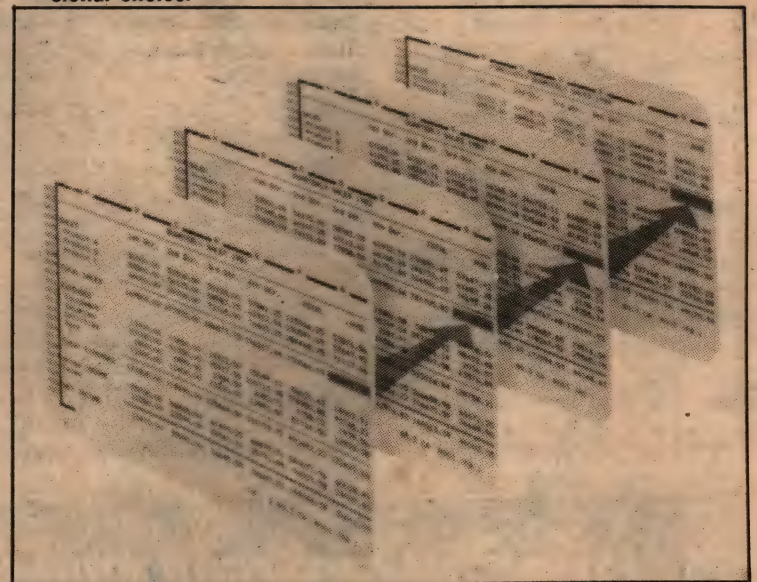
Minimum system requirements are an IBM Personal Computer, 128K of RAM and two disk drives or a hard disk (Report Manager is also available for other computers).

For additional information, contact Datamension Corporation, 615 Academy Drive, Northbrook, IL 60062; (312) 564-5060.

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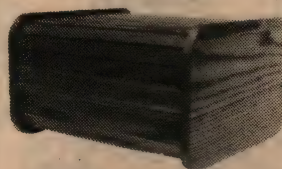
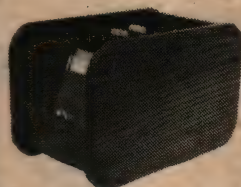
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Relay™, Makes Unattended Electronic Mail By PC A Reality

VM Personal Computing, Inc., (New York) now offers communications software for the IBM® PC providing an extraordinary level of flexibility for unattended operation. The latest version of this versatile package performs any number of file transfers - as complex as necessary - with any number of computers at any specified time. This level of sophistication is particularly useful for electronic mail operations; important documents or memos can usually be sent to each PC in an entire company overnight. Relay™ Version 2.2 is available for \$149 (suggested US resale) at participating VM Personal Computing dealers, or (for a limited time) direct.

Relay performs this communications artistry through a number of built-in capabilities and DOS-level enhancements, including a WAIT.COM command used in .BAT (batch) files to specify a time at which execution (of the batch file) can continue. Since Relay can be invoked with a system to be called in its command line (and file transfers handled internally through log-on scripts), an entire repertoire of automatic contacts can be included in a single batch file. Relay stores a **Directory of Computers**, which lists systems and their specifications, including communication protocols and parameter values, the names of log-on scripts to be invoked,

the baud rate to use, the number for the (assumed intelligent) modem to dial and more.

The .BAT files work with the log-on scripts (and with Relay's ability to perform multiple simultaneous operations - including sending, receiving, printing and editing files) to complete highly detailed, predefined operations in a few keystrokes. Relay can, for example, call another computer at a specified date and time (even up to one year later), perform a detailed log-on procedure (including passwords) and simultaneously send and receive files. And Relay's built-in editor makes it easy to develop both batch files and log-on scripts.

Relay also supports remote operation of a waiting unattended system. Once through Relay's two levels of password protection, a remote user can change default drives, check available space, display a list of files, send or retrieve files (including those in other subdirectories) and more. Users can also perform DOS commands (including applications) from within Relay, even while transferring files.

Relay's built-in editor has been greatly enhanced. This robust line editor builds or modifies files, including .BAT, CONFIG.SYS, BASIC program and other ASCII files, as well as Relay's own log-on scripts. Its dozens of com-

mands (including 19 function-key commands and 11 Alt-key commands) allow surprisingly sophisticated editing. It supports the entire extended character set available on the IBM PC. The editor also offers macros for performing predetermined sequential commands. Other options control display screen width, monitor mode, cursor size, auto-save commands and more.

Relay is completely menu driven. "Next step" options are always displayed on the screen and context-sensitive on-line help is available at any point in program operation. For detailed reference, an easy-to-understand user's guide is provided; it includes a concise tutorial, detailed reference sections, an index and a glossary of terms.

Relay now extends full intelligent modem support (including auto-dialing from its Directory of Computers and call status prompts) to Rixon® PC212A and Racal-Vadic VA212 modems in addition to the Hayes Smartmodem™. Direct connections, standard and auto-answer modems are also supported.

Relay supports several communications protocols, including XMODEM (CRC error-checking), ACK/NAK (checksum error checking), its own sophisticated SDLC-like error-free bidirectional protocol and ASCII terminal host support.

Relay's proprietary protocol supports full bidirectional data flow (true full duplex operation) with full error detection and correction and an extremely efficient algorithm for minimal data retransmission on error. This protocol is also available in the IBM mainframe (VM) environment through Please™, a companion product, for complete micro-to-mainframe communications support. Recent benchmark tests show Relay to be at least 30% faster than other communications software for the IBM PC and able

to process more data than the competition.

Minimum system requirements are an IBM Personal Computer with 64K of RAM, one disk drive, PC DOS (Version 1.0 or later), an asynchronous communications adapter and modem with RS-232 cable.

For additional information, contact VM Personal Computing, 60 East 42nd Street, New York, NY 10165; (212)697-4747 or (800) 847-3529.

Mention that you read about it in the Computer Shopper. ●

POPCOM™ C100 Modem Card For The IBM PC And Compatibles

Prentice Corporation has introduced the newest member of its family of POPCOM personal communications modem products, the Model C100. The C100 is a modem card product for the IBM PC, XT, portable and IBM slot compatible machines. The design of the C100 is based on the advanced features provided by a proprietary custom CMOS design developed by Prentice. This design is also in Prentice's recently released stand-alone personal computer modem, the POPCOM X100. The C100 is a 300 bps and 1200 bps, full duplex, auto dialing modem card with a full range of intelligent features that are compatible with most popular communications software. The suggested retail price is \$445.

Like the Model X100, the POPCOM C100 is capable of true voice and data switching done automatically at the user's workstation, which eliminates the need for separate telephone lines for the telephone and the personal computer. The process of dial-

ing multiple calls in order to switch between voice and data is also eliminated.

The voice and data handling feature further extends to include complete call progress monitoring and detection for dial tones, busy signals, remote ringing, voice, data, and even line current disconnect, with resultant cost savings handling uncompleted or interrupted calls. The Model C100 is fully compatible with AT & T 103, 113, and 212A dial-up modems and connects to standard single and multi-line phone equipment.

Jim Butterworth, President of Prentice Corporation states: "We feel that there will be continued strong growth in the card segment of the microcomputer modem industry. Some PC users prefer internal modem cards because it reduces the number of separate pieces of equipment they have to deal with. We have now extended our microcomputer modem line to include both advanced internal and external modem products."

Production deliveries started in June 1984. Dealers interested in merchandising the POPCOM C100 or POPCOM X100 should contact Prentice directly at (408)734-9810 or (408)734-9855.

The POPCOM C100 is a one of a full product line of modem and statistical multiplexer products designed and manufactured by Prentice since 1971.

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Toolbox For Sanyo 550

The Computer Toolbox has just released its communications program Intellicom (c) for the Sanyo 550/550 series of computers. This package now makes available to the Sanyo user a sophisticated means of both file transfer and simple terminal emulation.

The Sanyo version (1.9S) includes an INSTALL program which leads the user step by step through the initial installation including the formatting and copying of the disks. A SETUP program is also included. SETUP is utilized by Intellicom to configure the RS232 port automatically. SETUP is fully documented so the user can also utilize it for any other program or application that requires the use of this port.

Intellicom is menu driven and is easy to use, even for the beginner. Some of the other features of the program include Hayes Modem protocol support for autodialing, the ability to toggle on and off the printer, automatic dialing from phone directories stored on disk and the ability to operate at either 300 or 1200 baud.

Several file transfer protocols are supported including the most popular error checking protocol, Xmodem (also known as the Christensen or Modem 7 protocol). Complete documentation of these protocols is included at no extra charge, allowing the user to implement them on mainframes or minis that they may be communicating with.

Intellicom is a proven debugged communications program that is supported on several microcomputers. The retail price of the package, including a complete manual, is \$69.95. It is available from local Sanyo dealers or direct from the Computer Toolbox, 1325 East Main Street, Waterbury, Ct. 06705; (203)754-4197.

INTELLICOM

General Description

INTELLICOM is a sophisticated communications program that is easy to use even for the novice. With Intellicom you will be able to communicate with the various data and timesharing services such as Source and CompuServe as well as other remote systems.

Intellicom provides all of the most sought after features in a telecommunications program:

1. Operation at 300 or 1200 baud (minimum all versions)
2. The capability to transmit and receive data files (with optional error checking)

3. Menu driven with single key stroke commands
4. Help screens for all menu selections (Rainbow)
5. Terminal emulation
6. Simultaneous printer operation is supported
7. Ability to capture all data to disk
8. Automatic dialing utilizing Hayes Smartmodem (or equivalent)
9. Dialing from phone directories stored on disk
10. Host support code provided for error checking transfers for DEC systems 10, 20 and VAX (UNIX) Pseudocode examples for other mainframes are supplied.

Intellicom will allow your computer to look like a simple terminal. Additionally, you will be able to upload and download files from your computer to any other micro or mainframe. For example, you could prepare a document using any of the popular word processors on your micro and then download the finished work to another computer for printing. Our error checking protocol has been used to transfer astrological information to and from different observatories (Smithsonian Institute). This protocol has also

been used to transfer important spread sheet information around the world using satellite links (Cummins Diesel). This error checking method provides an easy to implement protocol to insure the integrity of all data transferred. It is the same protocol used worldwide on CP/M bulletin boards where a vast amount of public domain is available for free.

INTELLICOM

Technical Description

Additional hardware required:

Communications port and modem or direct connection to another computer

Operating speed:

300 or 1200 baud minimum all systems in terminal mode. File transfer mode is hardware dependent (up to 19.2K baud in Rainbow), 1200 baud minimum

Protocol support:

ASCII, ASCII Capture, RCPM checksum (fully documented), CompuServe Executive, XON/XOFF

A generic CP/M version is also available, please inquire. To order specify your computer and operating system.

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System	Min RAM	Operating System
IBM PC, Columbia, Compac or Leading Edge	128K	PC DOS 1.1 or higher (MSDOS)
DEC Rainbow	128K	CP/M, CP/M 86 or MSDOS
DEC VT180	64K	CP/M
Morrow MicroDecision	64K	CP/M
Northstar Advantage	64K	CP/M
Northstar Horizon	64K	CP/M
Sanyo 550/555	128K	MSDOS

Mychess: Championship Software For MS-DOS

Mychess, the true world champion microcomputer chess program is now available for the IBM PC and PCjr, Heath/Zenith (including the Z100, ZDOS), as well as many other popular C/PM and MSDOS computers.

The award winning Mychess has nine skill levels, challenging everyone from novice to master. It can play a variety of openings from its book of over 850 moves and features many other options. Among them are tournament time control, display of best line of play, as well as the ability to handicap and problem solve. Mychess is also capable of saving the game in progress for later resumption and records all moves on the screen.

The PC and PCjr versions of the popular chess program offer outstanding graphics with three dimensional representations of chess pieces. Four different, complete sets are provided to take advantage of monochrome and color displays on both IBM machines.

Mychess, the first program in the company's new Entertainment Series, retails for \$34.95. For more information and a free product catalog write The Software Toolworks, 15233 Ventura Blvd., Sherman Oaks, California, 91403, or call 818/986-4885.

Mention that you read about it in the Computer Shopper. ●

New Knowledge - Engineering Tool For The IBM Personal Computer

Teknowledge Inc. has announced M.1, a new software tool for exploring practical applications of knowledge engineering. M.1 is used to design, build and run stand-alone knowledge systems that solve problems normally requiring human intelligence. M.1 runs on the IBM Personal Computer and offers many capabilities previously found only on larger systems. The product includes a four-day training course.

Artificial intelligence is the discipline within computer science concerned with using computers to solve problems that require knowledge and reasoning.

Knowledge engineering is the process of acquiring, symbolically representing and manipulating knowledge in a computer program, called a knowledge system. Knowledge systems consist of two parts: a knowledge base containing facts and rules about a particular problem or application, and a program called an inference engine, which interprets the knowledge base to make judgments and draw conclusions.

Typical applications of knowledge systems include identifying a machine-part failure, diagnosing an illness, recommending an appropriate tool for a task and giving advice on the use of a complex computer program.

Simplifies Knowledge-System Development

Teknowledge designed M.1 to be easy to learn and use, reducing the time and effort required to develop a knowledge system. As a result, M.1 can be mastered by people with programming experience, but it does not require a background in knowledge engineering.

Using M.1, system developers create knowledge systems by building a knowledge base in a special Englishlike language. After the knowledge base is constructed, M.1 engages the user in a question-and-answer consultation, in English, about a specific program. M.1 uses the knowledge base to reason about the problem to make a recommendation or draw a conclusion.

M.1 is aimed primarily at people wishing to determine the applicability of knowledge-engineering technology to specific problems. The software has been designed for the rapid prototyping of potential

full-scale knowledge systems.

Extensive Capabilities

M.1 is the first knowledge-engineering tool with advanced features engineered for the microcomputer environment. To date, systems containing such features typically have required specialized or dedicated hardware, or knowledge of a symbolic programming language. M.1's advanced features include:

Englishlike knowledge-representation language, which makes it easy to express knowledge in the form of facts and "if-then" rules.

Iterative knowledge-base debugging, including facilities for tracing inferences, making temporary changes to the knowledge base, keeping track of inferences and conclusions for later examination and listing rules and facts by subject or concept. The system can display debugging information in a multiwindow format.

Automatic questions. M.1 automatically generates needed questions during a consultation if the system developer has failed to provide them.

Explanation facilities. Throughout a consultation, the user can ask the system to explain its reasoning or justify its conclusions.

Certainty factors. M.1 lets system developers associate a degree of confidence with facts and rules in the knowledge base. These certainty factors are used to control the inference process and qualify conclusions -- permitting the use of judgmental as well as objective knowledge.

Variables in the knowledge base. M.1's knowledge representation language permits the use of variables, allowing significant economies in the knowledge base because similar facts and rules can be reduced to more general expressions.

Price and Availability

Teknowledge's M.1 product runs on the IBM Personal Computer and is available now.

For more information contact Teknowledge, 525 University Ave., Palo Alto, CA 94307

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D.R.I.'s Concurrent PC-DOS Operating System Turns IBM PC Into Multitasking System

A flexible, easy-to-use operating system that increases the power and versatility of the IBM Personal Computer has been introduced by Digital Research Inc. Concurrent PC-DOS can run up to four PC-DOS or CP/M application software programs at a time.

Concurrent PC-DOS also includes features to improve the user interface, to shorten the time needed to learn to use the IBM PC, as well as such capabilities as data communications, windows and improved productivity tools.

Concurrent PC-DOS is aimed at professional users in Fortune 1000 companies. These users include corporate executives, financial analysts, technical personnel and administrative assistants.

The multitasking feature of Concurrent PC-DOS lets an IBM PC run up to four PC-DOS or CP/M application programs simultaneously. In this way, a user can edit a report while receiving data from a data base over a phone line. Concurrent PC-DOS runs most of the popular PC-DOS applications, including Lotus 1-2-3, dBase II, Wordstar, Multimate and SuperCalc 3. These application programs are listed by Softsel as among the best-selling software packages for the IBM PC.

To simplify operation of the PC and to make it easy for first-time users to understand the system, Concurrent PC-DOS features easy-to-use

menus that present the user with a series of tasks to perform when the computer is turned on.

The menu performs two functions. First, it guides the user through all the system's resources and applications. It takes care of those commands that control the computing environment, including copy, print and delete files. Second, the menu--via a free-form screen--lets users create their own menus or compose special commands to create custom help screens.

A communications capability lets users work on one application while the system receives information from a data base like the Source. The system's receiving data does not interrupt the user's ability to work on other tasks.

Concurrent PC-DOS's window capability lets users view, and thus monitor, the execution of four applications simultaneously. Windows can be positioned anywhere on the screen, scrolled or sized to display the most important parts of each application. Information can be cut and pasted from applications simply by placing the window over the appropriate data.

Several advanced productivity tools are included as part of Concurrent PC-DOS. With the Print Spooler, users can queue documents to be printed while other tasks are printing. Because of the operating system's multitasking

capabilities, printing and plotting can be done at the same time, or two printers can be run simultaneously.

Rolodex is a sorting and searching program for lists of names, addresses and other pertinent information. Names and addresses can be added or deleted or updated easily.

A two-user feature lets two people use the system at the same time. The primary use of this feature is as a remote dial-up link. For example, while a secretary prepares a document using a word processing program, a supervisor might pick up or leave messages from a portable computer somewhere outside the office. The secretary does not have to interrupt work.

Concurrent PC-DOS includes complete documentation.

Concurrent PC-DOS for the IBM PC will be available in the third quarter of this year. The suggested retail price is \$295.

Concurrent PC-DOS requires an IBM PC or PC-compatible system with 256 kilobytes of memory and two floppy-disk drives, although 512 kilobytes and a hard disk are recommended for maximum efficiency.

For additional information, contact Digital Research, 160 Central Avenue, Pacific Grove, CA 93950.

Mention that you read it in Computer Shopper.

C Utilities Package For IBM PC/XT

C Utilities Package enables C programmers to call functions that control screen, peripherals, graphics, animation, and math functions. It provides the most comprehensive omnibus I/O control for all of the IBM PC/XT peripherals.

Screen-control utilities include functions for menu selection, function key selection, full-screen input, window scrolling, multiple-screen pages, inverse video, blinking characters, multiple color strings, and various cursor sizes.

Peripheral control utilities provide a random number generator, date/time function, RS-232 serial port control, parallel printer port control, input and output port control, background music and sound generator, and a terminal emulator.

Graphics utilities provide functions to draw dots, lines, circles, or ellipses. It also provides a graphics cursor, and lightpen, mouse, and joystick control. SIGGRAPH Core's setwindow, setviewport, and clipping are provided for drawing graphics in screen or world coordinates.

Animation utilities provide

multiple pattern fill, picture, store, and picture animation.

Math utilities include sin, cos, tan, arctan, arcsin, arccos, ln, log10, exp, power, root, and sqrt.

Function algorithms are written in assembly language for speed and efficiency. These assembly modules form a separate code segment which does not use any space from the 64K code segment as provided by the Lattice/Microsoft C compilers. Price of the complete package including demo programs, and 150 page manual is \$119. Requirements: 128K, two disk drives, C compiler.

Software Labs also provide utilities packages for IBM Pascal, Microsoft Pascal, IBM Fortran, Microsoft Fortran, and Pascal/MT+.

For more information contact: Software Labs, 1221 Matisse St., Sunnyvale, CA. 94087; (408)730-8108.

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PORTABLE COMPUTERS

Geneva PX-8, Second Generation Notebook

By Linda Thacher

Epson America pioneered the Notebook (or Lap) computer with its HX-20 Portable Computer but it lost the leadership to newer machines with larger displays and built-in software. Now they have returned to the market with the Geneva PX-8 Notebook Computer designed to compete with the other Notebook Portables on the market.

The Geneva measures 8 1/2" deep by 11 1/2" wide by 1 3/4" high and weighs only four pounds. It is part of a complete system with its own disk drive and printer and the complete set is portable and battery powered.

The keyboard has 72 keys and is available in a variety of language configurations in addition to English. The keys are standard sized and have an excellent "feel" to them. They are curved to the finger touch and are a pleasure to type upon.

Shift mode is indicated by a LED for operator convenience. All keys except control and function keys are Auto-Repeat.

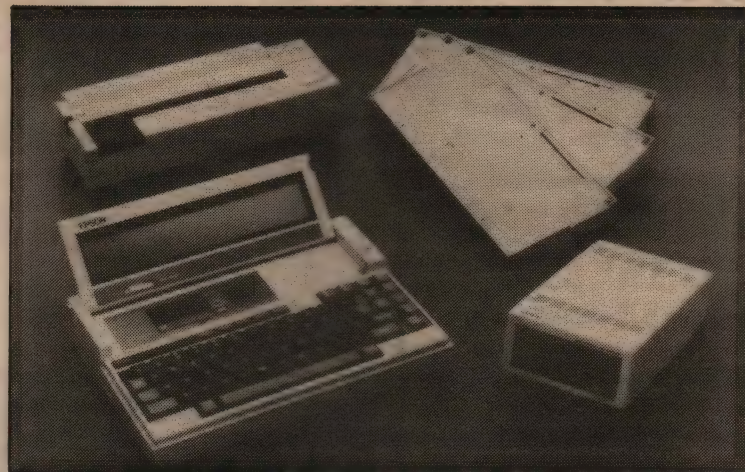
The LCD display folds up into viewing position and has an adjustment slide button for the most comfortable viewing angle. The screen has 8 lines of 80 characters in the text mode and a graphic resolution of 64 by 640 pixels for graphics. It has been designed for rapid update so that spreadsheets can be calculated. The main fault I find with the Geneva is this display. I wish Epson had given us more lines. In addition, I had trouble reading it. This may have been due to lighting in the room and the fact that I am not used to looking at LCD screens. I did get used to it after a while.

Under the LCD Display, is a micro-cassette and a speaker that can be trained to make noise. The Geneva is provided with both RAM disk and floppy disk options for data storage

so this will never be a problem. I frankly do not think that the cassette will be used that much in this country where we tend to use disks and RAM-disk, but in Europe and Asia, the cassette is used more often. Anyway it's there when you want it.

The Geneva uses three microprocessors, a Z-80 operating at 2.46 MHz for general processing, a 6301 "slave" processor for housekeeping functions like updating the screen and I/O, and a 7508 for the keyboard and the time date and alarm functions. All the processors are low-powered CMOS.

In the memory department, Geneva has 64 Kb of main RAM, 6 Kb of video RAM and 32 Kb of ROM containing the operating system. There are two ROM Capsule Sockets on the bottom for plugging-in the firmware ROM Capsules, or



The Epson Geneva/PX-8 System

the RAM-disks mass storage options.

The built-in software includes BASIC, the CP/M 2.2 operating system and three MicroPro Software Packages on ROM covering word processing, spreadsheet and scheduler. Additional ROM

packages can be added later.

The ROM software is worthy of mention because it represents a landmark in the effort to make personal computers easy to use. What MicroPro has done is to take

Continued on page 52



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Geneva

Continued from page 51

the standard WordStar word processor and create a "Portable WordStar" which retains all the necessary features of the standard program and only deletes the functions that can not operate with a LCD screen and battery power. Then they added "Portable Calc" and "Portable Scheduler". To top it off, they offer these programs in English, French and German versions! Putting all this into a 32K ROM deserves the software compacting award of

the year! Interestingly enough, spreadsheets may be transferred into Portable WordStar documents.

The Geneva is powered by rechargeable NiCad batteries that are removable. They are rated at 1100MAH and are recharged by a built-in AC adapter with overcharge protection.

After you absorb what Epson has accomplished in the Geneva, you then begin to realize that here is a Complete computer system that is truly portable.

The peripherals are just as remarkable as the computer. A battery powered disk drive, printer, modem and RAM-disk unit comprise the Geneva family. They can all be carried in a small suitcase without breaking your arm.

The suggested price for the Geneva is only \$995, the disk drive is \$599, the printer \$250.

The new 3 1/2" floppy disk drive that is totally battery-operated and contained in a casing only 8 1/4" x 4 3/4" x 2", dramatically enhances the power of the Geneva/PX-8 notebook-size computer.

The lightweight, compact peripheral is the first totally battery-operated disk drive, yet it has double-density, user-accessible 320K bytes. Two of the individually packaged drives can be "daisy-chained" for double the power and capacity.

The new disk drive has a 38,400 bits/sector transfer rate, but can be configured to operate at 4,800 baud. Ni-cad batteries provide approximately 50 hours of portable power,

and when power drops to four volts, backup batteries flash a light to alert the user of the need for recharging. A charging unit is included with the disk drive.

The Geneva Printer is a new 9-pin, 80-column dot matrix printer that offers a variety of type sizes and styles in thermal or thermal transfer printing at 45 characters per second.

The new printer measures only 2 1/2" x 4 1/2" x 11 1/2", yet can accommodate regular 8 1/2" x 11" as well as 5 1/2" wide paper. The unidirectional printer's single-sheet friction feed can take regular bond paper or, if clearer resolution is desired, thermal paper.

Users have a choice of three pica and three elite type styles (normal, enlarged and condensed), which provide a range from 40 to 160 characters per line. A bit-image mode offers 8x480 dots/line dot-addressable graphics. It features a 9x9 print matrix.

The character set includes 95 normal ASCII characters, 33 international characters for 8 countries and 32 graphics characters. Standard spacing of 6 or 8 lines per inch is complemented by proportional line spacing, which allows users to customize spacing according to their needs.

Two standard interface ports, an RS232-C serial 8-bit and a Centronics-style parallel, enhance the printer's flexibility.

Ni-cad batteries and an AC adapter are included.

The "multi-unit" for the Geneva/PX-8 notebook-size computer combines a 64K RAM disk and a direct-connect modem in a single snap-in peripheral.

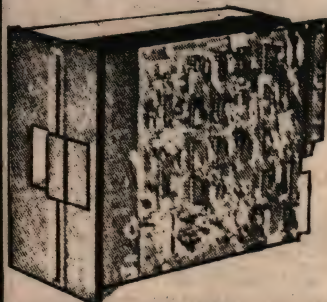
The direct-connect modem, which does not require a telephone, is capable of full duplex communication over telephone lines at a bit rate up to 300 baud and is Bell 103 compatible. Quality of communications can be monitored with the PX-8's built-in speaker. Equipped with an FCC-approved telephone interface, the unit features automatic dialing and answering for both pulse and touch tone systems, so the modem can be used anywhere in the country.

With a Centronics-style parallel interface, the multi-unit is expected to be available in mid-August at a suggested retail price of \$360.

Solid-state disks of 60K RAM and 120K RAM are also available for memory expansion of the Geneva.

Data files for word processing, spreadsheets and other popular functions can be stored on the RAM disks as if they were stored on floppy disks.

The 60K and 120K RAM disks are expected to be available in late July for suggested retail prices of \$329 and 460 respectively.

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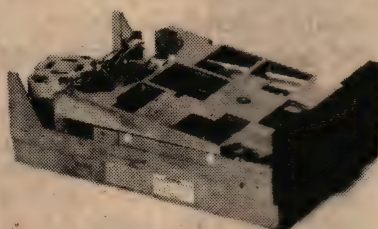
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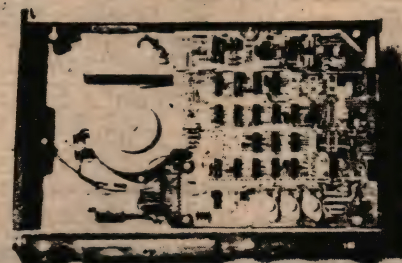
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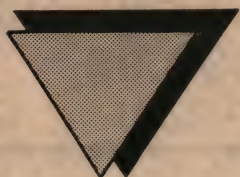
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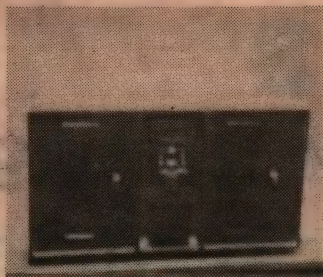
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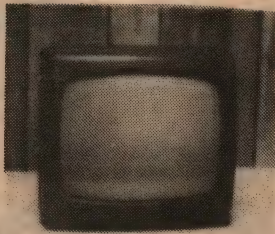
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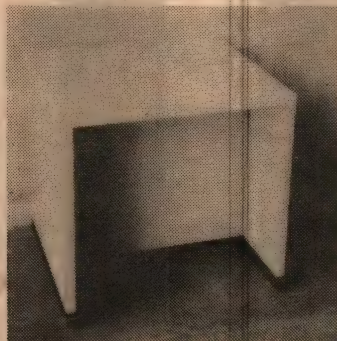
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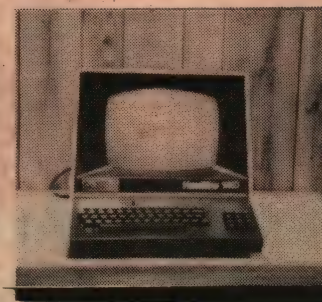
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COMMODORE

Inside The VIC-20/Commodore 64 Part VII: Meeting SID

Chips, chips, and more chips!

By Ted Drude

This series began with a short look at programming aids for the 6502/6510 CPU chip used in the VIC 20 and C64. Lately, if you have been following along, you know that we have been exploring the 6567 VIC II chip of the Commodore 64 in some detail and this month, we will be looking at the 6581 Sound Interface Device (SID) of the 64. In the future we will be digging into serial and parallel interfacing with printers and other peripherals.

There is a reason that we are centering on chips as we explore the hardware of these two machines. Simply put, the hardware can be classified by dividing up the circuitry into three distinct sections. Each of these sections has a major programmable chip that controls that area. Since this is the first time I have mentioned this, I want to outline it now for future reference.

Here are three main sections in the VIC-20 and C-64:

1. The Processing section, which consists of: The 6502/6510 CPU, RAM and ROM memory. This makes up the central "core" of the computer, doing all of the actual "computing". The main programmable chip in this section is, of course, the CPU itself. In order to program it directly, you must use PEEKs and POKEs or (my favorite) Assembly Language. The CPU is also the "master" of all programmable chips in the other sections.

2. The Audio/Video Output section includes the Video and Sound interface chips. These chips are arguably the most complex in the computer. They are dedicated microprocessors that generate audio and video

signals under the direction of the CPU. They are controlled through internal registers and shared memory areas (such as screen, character, and color memory). In the 64, the 6567 VIC II chips handles the video output, while the 6581 SID chip handles the sound output. In the VIC-20, the 6560 VIC I does both jobs.

3. The Peripheral Input/Output section consists of interface chips that connect the keyboard, the cassette unit, the Commodore serial bus (printer, disk drive, etc.), and the user (RS-232) port to the internal bus of the computer. They perform the logic-level electronic transformation and buffering functions that are required for peripherals. In addition, they contain numerous optional features such as real-

time clocks, interval timers, and programmable interrupt controllers. Their internal registers are used by the CPU to control them. The main chips in this section are the 6522 VIA (Versatile Interface Adapter) in the VIC-20 and the 6526 CIA (Complex Interface Adapter) in the C-64.

There is overlap among some chips in their functions. For example the 6510 CPU also has a 6-bit on-chip I/O port. In the C-64, some of those lines are used for cassette I/O lines and others for RAM bank switching. So, the above classification is generally correct, but there are some minor exceptions.

You learn how to program the CPU by studying 6502 Assembly Language. Our brief look at the subject (Part 1 of

this series) should begin to help you in that. We have just completed a thorough look at programming the VIC II chip and will now look at the SID chip. After that we will be looking at the VIA and CIA interface chips. The key to really getting a handle on the inner workings of the Commodores is through studying the main chips. Without knowing them, there is little chance of becoming a Commodore "expert".

Because of the popularity of the 64, we have centered mainly on its video and audio chips. VIC-20 owners should be able to get some insight into their machines particulars through this, but they will have to rely on their Programmer's Reference Guide for specific

Continued on page 60

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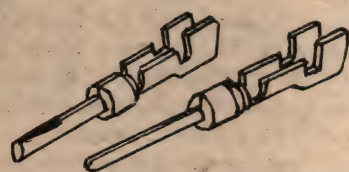
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IDC50S	CALL	CALL	CALL



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P15S	3.66	3.36	3.05
P25P	2.90	2.66	2.42
P25S	4.39	4.02	3.65
P37P	4.30	3.94	3.58
P37S	8.18	7.50	6.82
P50P	5.50	5.04	4.58
P50S	10.70	9.81	8.92



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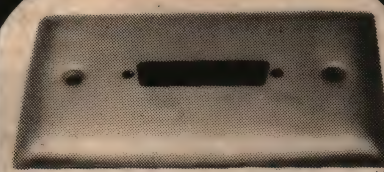
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C25P	.90	.83	.75
C25S	.94	.86	.78
C37P	1.04	.96	.87
C37S	1.06	.97	.88
C50P	1.14	1.05	.95
C50S	1.20	1.10	1.00



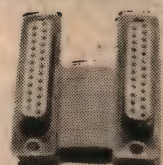
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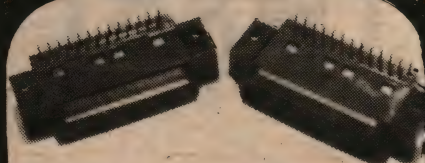
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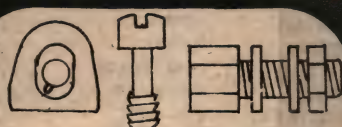
P.C. MOUNT RT ANGLE

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R9S	2.60	2.39	2.17
R15P	2.98	2.73	2.48
R15S	3.10	2.84	2.58
R25P	3.72	3.41	3.10
R25S	3.00	2.75	2.50
R37P	4.70	4.31	3.92
R37S	4.90	4.49	4.08
R50P	CALL	CALL	CALL
R50S	CALL	CALL	CALL



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W15S	4.70	4.31	3.92
W25P	5.40	4.87	4.33
W25S	7.34	6.73	6.12
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IDH-26WR	3.25	3.09	2.93
IDH-34WR	3.80	3.60	3.43
IDH-40WR	4.65	4.43	4.20
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IDH-26W	3.20	3.05	2.90
IDH-34W	3.75	3.54	3.37
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IDS-26	2.40	2.25	2.10
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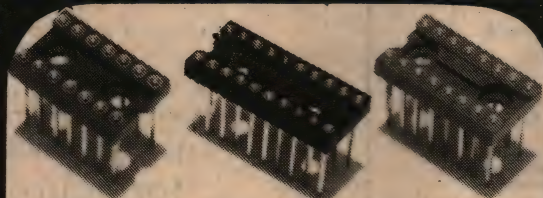
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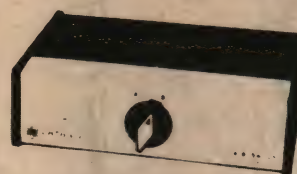
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Inside VIC-20 Continued from page 57

details. When we look at serial and parallel interfacing, I plan on spending more time on the VIC.

Most of this series has been in a tutorial form that presents the most important points of a topic and then gives you the references of where to dig into each subject on a deeper level. I have also tried to share some hints and ideas along the way to make things a little easier for the average person to understand. I expect to stay on that level. If this has been helpful to you, drop me a line c/o the Computer Shopper. If you have suggestions for improving the series, please let me know. I am here to help you, the Commodore user.

(A Short Note on the New "TED" Chip)

It appears that the "next generation" from Commodore has squeezed the CPU, the

audio/video interfaces, and some peripheral I/O capability onto one single chip! This is the 7500 series chip, also known as the "TED" (Text Editing Device) chip. While this move may decrease flexibility somewhat, it markedly lowers production costs. This will make the new Commodores stiff competition in their market.

The new single chip device will undoubtedly be programmed much as the existing VIC I and VIC II, but will lack sprite capabilities and full synthesizer sound, making the C-64's multi-chip design more powerful. The replacement for the VIC-20 (rumored to be called the Commodore "16") will be a great improvement from the 22 column display of the VIC-20 with 40 columns and many more colors (256) to choose from.

Introducing SID

This month we are going to take a look at the 6581 Sound

Interface Device (SID) on the Commodore 64. This chip packs more power in sound capabilities than many stand-alone music synthesizers. In fact, Commodore once intended to market a synthesizer based on this chip, but apparently abandoned the idea as demand for the C-64 grew. It simply wasn't feasible to market both a \$1000 synthesizer and a \$200 computer with the same synthesizer built-in!

If you simply want to use your C-64 as a synthesizer or electronic organ, you do not have to know how to program it. Fortunately, for some of us, others have already done the "dirty work" of programming and we can be making music by buying pre-written programs and running them.

One of the best known, and best regarded, software packages is MusiCalc (available from: Waveform Corp., 1912 Bonita Way, Berkeley, CA 94704). At \$49.95 it is a bargain. A 64

with MusiCalc makes a true synthesizer available for a mere pittance compared to other options. MusiCalc also has score-writing expansion and other options available. This unlocks the potential of the SID chip for the music/sound explorers among us.

The Secret of SID

SID can produce almost unlimited noises, tones, and sounds. To use all of its potential, you might think you have to understand both sound theory and synthesizer design! That might help, but, in reality, it can be used with relative ease by most programmers, provided they understand what they want to do with the chip and they have the proper software "tools".

The "secret" to using SID is the same secret we discovered while using the VIC II chip. First, we look at the hardware and divide its functions to better understand the register map. Second, we derive

methods of using software utility "tools" in conjunction with our programs to put the chip to work. "Divide and conquer" describes this technique. Divide the hardware into understandable blocks, then discover or devise the software needed to conquer the programming problem. This is a key method in solving a lot of computer-related problems.

It is not absolutely necessary that you understand all of the theory behind SID in order to use it, but as you discover the power of shaping sound through computer software, you will find the theory very helpful! For simple users, you do not have to use the sound shaping capability, but you must insure that some minimum parameters are set in order for the sound to be heard.

The Block Diagram

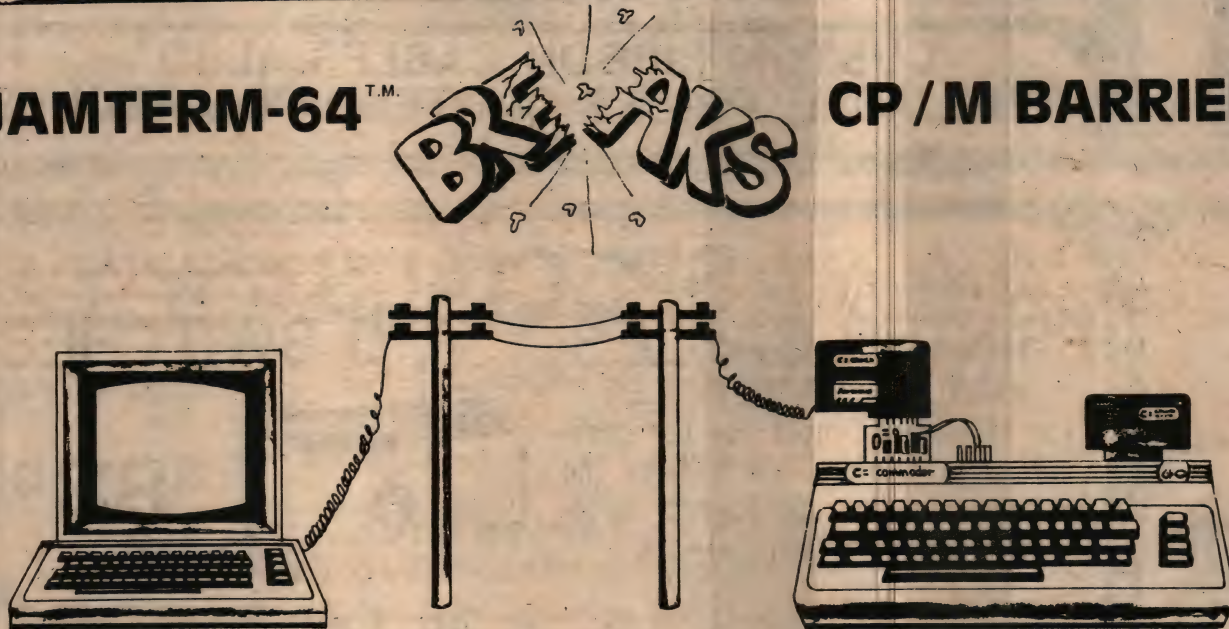
If you don't already have the Programmer's Reference Guide, get it! There is simply no other source for much of this information. I think that book is so necessary to understanding a 64 that it should have been standard equipment. Unfortunately, it is an added cost, but it is invaluable for programmers. By referring to the diagram, you will see that there are numerous components to SID. It is a very sophisticated chip.

The Programmer's Reference Guide introduces SID in chapter 4. There are some example programs there and a

Continued on page 62

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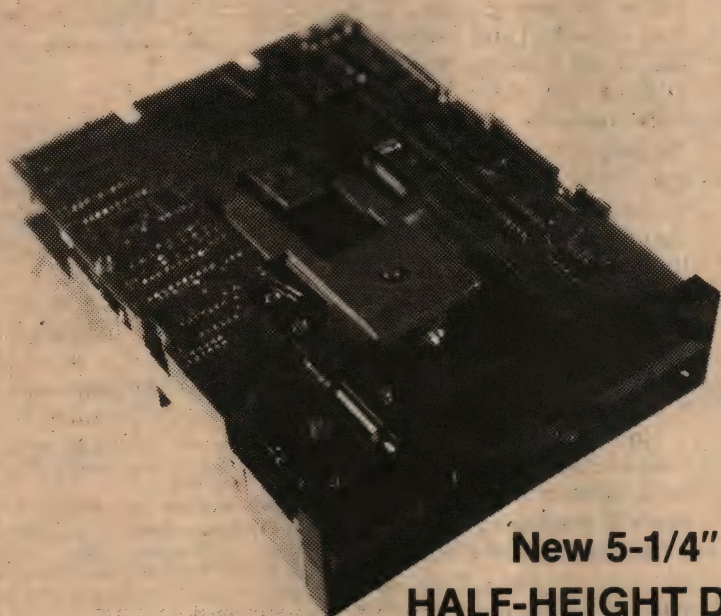
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Inside VIC-20

Continued from page 60

short discussion of music waveform theory. This is all valuable in understanding SID, but really doesn't describe the hardware of the chip in an understandable form.

There is a much better description of SID in Appendix 0 on pages 457-481. In fact, the block diagram of SID on page 459 of the Reference Guide is very good. For those of you who don't have the Programmer's Reference Guide, I have redrawn the SID block diagram in figure 1.

The Sound Channels

First of all, there are 3 independent sound "channels" (also known as "voices") within SID. Each of these channels has a series of components and switches that combine to produce a final output signal. Let's look at these channels and see how they produce their sound.

Each channel starts with a Tone Oscillator Waveform Generator. This oscillator can produce a tone that is programmable from 0 to 4 kHz. This gives the chip a wide range of audible frequencies. The tone generator also produces its tone in one of four standard, switchable, waveform patterns: pulse, sawtooth, triangle, or noise. The sound pattern, as well as its pitch, affects its quality.

Along with the tone generator, there is a Sound Envelope Generator for each sound channel on the chip.

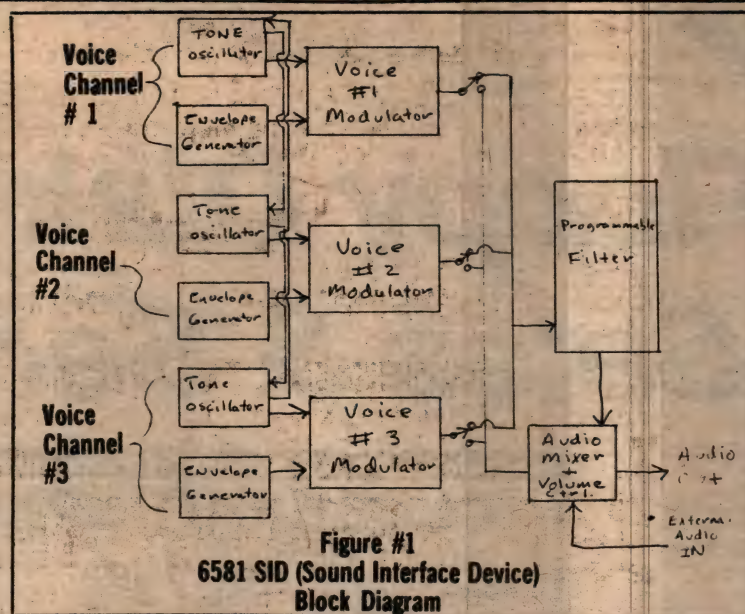


Figure #1
6581 SID (Sound Interface Device)
Block Diagram

This envelope generator determines some very specific characteristics of the sound that will be generated. Many people have trouble grasping the concept of this sound shape and therefore have a hard time understanding what happens next.

Basically, the sound envelope shape (which is not the same as the waveform shape) will determine sound characteristics based on volume levels at the various stages of the sounds "development". The Attack, Decay, Sustain, and Release (ADSR) concept describes the overall characteristics of a sound from the time it becomes audible until the time it becomes inaudible. The initial rise from zero volume level to a temporary peak value is the Attack value. The time of decay from the

peak value to the normal Sustain level is called the Decay value. After the sound has been triggered by the Gate switch, it is held at the Sustain level until the Gate switch is turned off. Then the sound falls from the Sustain level to zero volume again at the rate determined by the Release value.

All of these values are programmable. That is, the Attack time, the Decay time, the Sustain level, and the Release time may all be varied through software registers. The Gate switch, which controls all of this, becomes the determining factor for the Sustain time (time, not level). It, too, is a software switch. Page 196-197 in the Reference Guide expand on the idea a little more.

After the tone has been generated, but before it is fed into the proper Amplitude Modulator and mixed with the Envelope generator, it can be sent to another channel's tone oscillator which will automatically mix it into the

waveform it is generating. This allows for special synchronization and "ring modulation" effects between the channels.

Finally, the output of the independent "voices" is switched either directly into the master volume control box, or into a programmable filter. The programmable filter can have low-pass, high-pass, or band-pass characteristics, giving you even more control over the overall sound of the chip. At this point it is also possible to insert external audio signals for mixing into the filter input or with the composite output of the three voices.

The filter output and the directly switched voice output is then mixed and sent to the master volume control. It is then amplified and sent out to the TV modulator or the direct audio output on the 5 or 8 pin DIN connector. You can feed the output directly into the input of your stereo sound system for amplification. This means that the sound of the 64 is only limited by the size of your external system. The possibilities boggle the mind!

Sounds Galore!

Now that you have been introduced to SID, you are probably itching to get it singing. We will get into the programming specifics next month. Until then, brush up on your Boolean functions (AND, OR, NOT). We will be using them, again, to switch bits on and off within SID. Until then, try looking at the little demo program below to get a better understanding of how SID is programmed. Until next month, have fun with SID and your 64!

```

10 REM SID SOUND DEMONSTRATION PROGRAM
20 REM
30 REM (C) COPYRIGHT 1984 BY
40 REM
50 REM TED DRUDE
60 REM
70 REM ALL RIGHTS RESERVED
80 REM
90 REM
100 PRINT CHR$(147);
110 PRINT "SID DEMONSTRATION PROGRAM"
120 PRINT
130 PRINT "THIS LITTLE ROUTINE ALLOWS YOU
140 PRINT "TO USE THE UP OR DOWN CURSOR
150 PRINT "TO RAISE OR LOWER THE VOICE TONE
160 PRINT "FREQUENCY. IT IS RATHER SIMPLE"
170 PRINT "BUT IT IS MEANT TO BE A LEARNING"
180 PRINT "DEMONSTRATION OF HOW TO PROGRAM
190 PRINT "A VOICE, NOT A FULL CHORD ORGAN
200 PRINT "OR SYNTHESIZER.
210 PRINT
220 PRINT "HERE ARE THE COMMANDS:"
230 PRINT
240 PRINT "CURSOR UP = HIGHER TONE
250 PRINT
260 PRINT "CURSOR DOWN = LOWER TONE
270 PRINT
280 PRINT "PRESS (RETURN) TO STOP "
290 PRINT
300 REM ASSIGN VARIABLES TO SID VALUES
310 REM
320 REM USE VOICE # 1
330 REM
340 LET FRI = SID : REM FREQ. CTRL. (7 BYTES)
350 LET PUI = SID+2 : REM PULSE WIDTH (2 BYTES)
360 LET ERI = SID+4 : REM ENVELOPE GEN. CTRL. (2 BYTES)
370 LET FRI = SID+6 : REM FREQ. CTRL. (7 BYTES)
380 LET FRI = SID+8 : REM FREQ. CTRL. (7 BYTES)
390 REM
400 REM
410 REM THIS SECTION OF THE PROGRAM WILL
420 REM SET-UP SID VOICE # 1. THE
430 REM PROPER PROCEDURE FOR PROGRAMMING
440 REM A VOICE IS TO:
450 REM
460 REM 1. SET UP THE VOICE FREQUENCY
470 REM
480 REM 2. SET UP THE ENVELOPE PARAMETER
490 REM
500 REM 3. SET THE MAIN VOLUME CONTROL.
510 REM 4. FINALLY POKE THE VOICE
520 REM
530 REM THE WAVEFORM PATTERN AND
540 REM
550 REM SET UP VOICE BASE FREQUENCY
560 REM
570 REM SET THE TONE VALUE IN HZ
580 REM
590 REM
600 REM
610 REM USE THIS FORMULA TO MAKE POKE VALUES
620 REM
630 FVA = INT(FOUT/.06097)
640 FH = INT (FVA/256)
650 FL = INT (FVA-(FH*256))
660 REM
670 REM
680 REM NOW POKE INTO VOICE #1 FREQ. REG.
690 REM USING LOW-BYTE, HIGH-BYTE FORMAT
700 REM
710 POKE FRI,FL : POKE FRI+1,FH
720 REM
730 REM
740 REM SET UP AN ENVELOPE PATTERN
750 REM
760 POKE ERI,6:POKE ERI+1,15+16
770 REM
780 REM BRING MASTER VOLUME CONTROL
790 REM UP TO FULL VOLUME (15)
800 REM
810 POKE FRI,15
820 REM
830 REM NOW ENABLE SOUND OSCILLATOR
840 REM
850 POKE CRI,33
860 REM
864 REM KEYPRESS ROUTINE
866 REM
870 GET AS:IF AS=""THEN GOTO
872 REM
880 REM CURSOR UP = HIGHER TONE
882 REM
890 IF AS=CHR$(145)THEN FOUT=FOUT+100:IF FOUT>4000 THEN
FOUT=3000
892 REM
894 REM CURSOR DOWN = LOWER TONE
896 REM
898 IF AS=CHR$(146)THEN FOUT = FOUT-100:IF FOUT<0
THEN FOUT=1
899 REM
900 REM RETURN TO SHUT OFF VOICE
902 REM
904 IF AS=CHR$(13) THEN POKE CRI,0:END
906 REM
908 REM GO SET NEW VOICE FREQUENCY
910 REM
912 REM
914 REM
916 REM
918 REM
920 REM
922 REM
924 REM
926 REM
928 REM
930 REM
932 REM
934 REM
936 REM
938 REM
940 REM
942 REM
944 REM
946 REM
948 REM
950 GOTO 630

```

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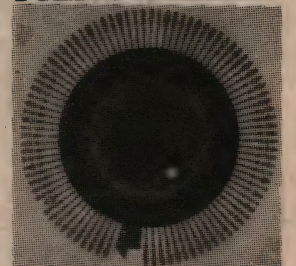
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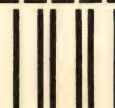
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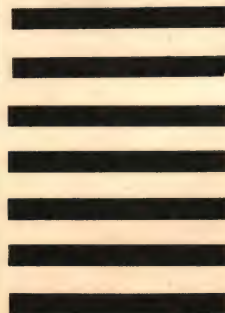
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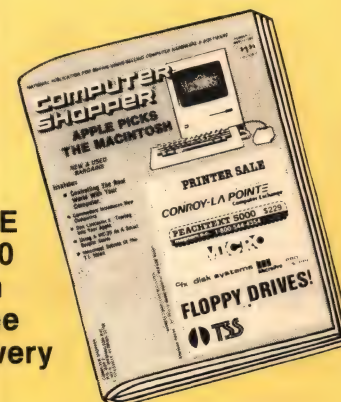
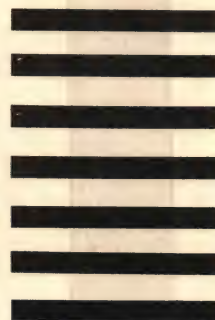
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Commodore 64 Software Reviews

by Cheryl Peterson

BEACH-HEAD

Access Software
Commodore 64
Disk; joystick

Your mission, kid, should you decide to accept it, is to land your forces on the beach, get your tanks inland to Kuhn-Lin and destroy the fortress there. Standing in your way is a fleet of ships, their accompanying planes, bunkers, enemy tanks, and machine guns. Your forces consist of 10 ships with cannons and eight tanks, if you can safely land them on the beach.

To start the game, you can either attack directly by heading straight for the enemy fleet with your ships OR attempt to maneuver your 10 ships through the mined secret passage. This passage is criss-crossed with torpedoes. For each ship successfully navigating the channel, you are awarded 3,000 points. Another advantage of this route is that you sneak up on the enemy, catching him unaware.

When the two fleets meet, an air battle ensues. You must

shoot down the enemy planes with your cannons before they can sink your ships. Each of your ships can only take 20 points worth of damage before it blows up. If you chose the direct route, you have ten ships. Because the enemy knew you were coming, they are ready for you with more planes. If you snuck in, you will probably have less than ten ships. But because the enemy was unprepared, you don't have to shoot down quite as many planes.

Once you've disposed of the enemy fighters, you have to sink their fleet. This is done with your big cannons. By using ranging, you zero in on each ship. You have to get them before they get you. The biggest aircraft carrier will try to escape. It scores 10,000 points if you sink it.

After destroying the fleet, you must land your tanks on the beach. Because of the size of the harbor, only eight tanks can be landed. These must proceed to the fortress. You control each one individually. Once you reach the fortress, ten correctly placed shots will destroy it.

The graphics in this game

are very good. The sound quality is excellent as well. You can adjust the sound and border color to your liking. You can pause the game and come back later, or escape whenever you get tired. If you just drop everything, after about a minute the game will start playing against itself. This is a great way to check out the different sections of the program. You can pick-up play at any time, so if you want to practice getting the tanks to the fortress, for instance, there is a way to do it easily.

The documentation is excellent. There are tips for getting a high score, instructions detailing how the joystick controls the action in each sequence, the usual bit on how to get it up and running, and how to modify the sound and colors.

The disk is copy protected, but it does keep a list of top ten scores that can be updated after each game. Because of the many levels of play in order to win this one, I think it would take a long time to get boring. There are four levels of difficulty, so as you get better, you can make it tougher on yourself. The game can be

played by one or two players. If you enjoy arcade style games with good graphics and sound, your money won't be wasted on this one.

NEUTRAL ZONE

Format: Cassette or Disk
Price: \$34.95
Language: Machine
Model: Commodore 64
Source:
Access Software
925 East 900 South
Salt Lake City UT 84105
Rating: Excellent

This is another of Access Software's great graphics and sound programs. If you try to play this on a black and white or green screen monitor, shame on you. To really appreciate this one, you need a full sized galactic background, because the star fields and rotating galaxies are terrific.

You are the firing technician (that's what they call 'em in the military), located in a gunnery pod. The base, Alpha IV, is being attacked by enemy ships from another galaxy. Your job is to protect the base by destroying the enemy ships.

The master control panel shows whether the nearest in-

truder is to the left or right, how much time you've taken, the amount of damage to your pod, the base and the enemy. The cross-hairs of the laser cannon enable you to zero in on the enemy. Once the cannon has been fired, you must wait until the shot passes out of range or hits the target.

The incoming ships aren't just trying to destroy the base. They shoot at you most of the time. You can blast the incoming shots, so they don't do any damage to your turret. This is a good idea, since your rotating capacity will be decreased by 25% if you get hit 5 times. It becomes almost impossible to hit the enemy ships at this point. You can no longer track as fast as they move, so you have to go around the other way and wait for them to come into range. This wastes valuable time. If they succeed in making a second pass, they 'kamikaze' the base. This counts as 5 direct hits.

The number of enemy ships that must be shot down depends on the difficulty level chosen at the start of the game.

Continued on page 66

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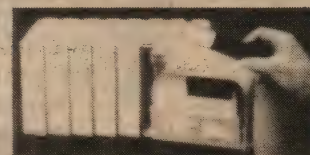
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Commodore 64 Software Continued from page 65

This ranges from 10 to 50 ships. If you don't protect the mother ship well enough, it blows up. Win or lose, your performance is ranked from tourist to superman. This is based on the length of time you take, how many of the enemy and their incoming torpedoes you destroy, how many hits the turret takes and the level of difficulty.

Like other Access games, this one plays itself if you leave it alone for a minute. The anonymous pod master is a great shot, by the way. You can quit in the middle of a game if you've chosen a skill level that's too much for you. If you need to run off for a second, there is also a pause feature.

The documentation with this program is compact, but sufficient. Except for a few fundamentals and playing tips, the best way to get started with the game is to play it. It is, however, addicting. So don't start playing if you have somewhere to be in half an hour.

Even for an old lady like me, this is an enjoyable game. The graphics and sound are great. The game plays fast and furious when you set it on crazy. I recommend it highly. It is not your average shoot 'em up.

Paint Magic

System requirements:
Commodore 64 with disk drive and a joystick
Price: \$49.95
Manufacturer: DATAMOST, Inc.

Smartline Cable Connects Commodore 64 and Vic-20 Computers To Popular Printers

Computer Accessories Corporation (San Diego) now offers a "smart" cable (with built-in circuitry and software) that lets many popular (parallel) printers work with the Commodore 64 and Vic-20 computer systems. The Smartline C600 Intelligent Cable is available for \$69.95 (suggested US resale) at participating Computer Accessories Corporation dealers.

The C600 comes with software (code conversion) utilities built right into the cable. These convert Commodore's non-standard codes into a more standard format; as a result, printers can produce characters exactly as they appear on the screen. The C600 eliminates the conversion problems that typically plague other interfaces.

The C600 works with most parallel printers, including

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This program lets you paint very detailed pictures with the Commodore 64. Paint Magic lets you save your picture as a program on disk when you are through. Pictures can be loaded from disk, modified and resaved. The pictures can then be reproduced on the screen with or without the Paint Magic program.

The many modes in which it operates let you create a line drawing using your joystick, fill in any enclosed area with color, put in one dot at a time, take a close up look at any section and modify it, merge one picture into another and draw boxes, circles, triangles, and other geometric figures.

If that's not enough, you can erase the whole thing and start over, restore your picture to what it looked like before the last adjustment you made, or move parts of your work around at will. You can even draw a little picture and reproduce it all over the screen.

I can't imagine a more comprehensive drawing program than this one. The ads claim it's "the ultimate electronic paintset that turns your TV or monitor into a stained-glass canvas." That's just what it does.

In many ways it is an improvement over conventional drawing. I couldn't draw a straight line if my life depended on it. This program makes

it easy. In one of its modes, you plot a point and then just move the joystick. Wherever your joystick goes, a straight line connects your plotted point and the cursor. When you get the cursor where you want it, you exit that mode. Your line now goes from point A to point B.

Arcs, angles, points, boxes, circles and rays are all equally easy to make. Coloring in an area is merely a matter of picking a color (or colors and a pattern), putting the cursor somewhere inside the figure and hitting the fire button. You can keep changing it until you get it the way you want it.

Many programs of this type would take you through a quick survey of their commands and then leave you hanging. This one has a step-by-step tutorial followed by a summary of the commands and how to use them. From loading the program to special effects, the instructions are straight forward.

The program is a bit complicated at first. But once the different functions are understood it is easy. The restore command is a life saver. It more than makes up for the complexity of the more advanced features. Even a novice computer user should find this program usable.

It isn't, however, very receptive to inappropriate commands. Because of its complexity in the more advanced functions, it is possible to put in the wrong command inadvertently. But this is rarely a fatal error because of the restore function.

One objection that I had in this department was the failure to double check when you want to delete a picture from disk or erase the canvas. Although it takes a combination of keys to erase the picture, most well-written programs require a "yes" response to some kind of "Are you sure?" question before performing an irreversible command. By using the restore function, it is possible to recover erased picture. But if you are working on two slates at once, one of the pictures could be lost. With deleting a file, it is always good to double-check. It usually gets you to make sure you've entered the right name, at least.

Comparatively speaking, this program is fairly priced. The only feature missing is the ability to create a hard copy of your work. There is no provision to print your pictures. A similar program, Doodle, selling for around \$40 has that ability, but it doesn't have fills or some other nice features of Paint Magic. If it were not for this one deficiency, this would be a perfect program.



models from Anadex, Brother, C. Itoh, Epson, NEC, Oki-data, Star Micronics, Transtar, and others.

For additional information contact Computer Accessories Corporation, 7696 Formula Place, San Diego, CA 92121, (619) 695-3773.

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1333	Koala Graphic Tablet-CMD64	99.95 75.00
1883	Kraft Joystick (At Type)	16.95 13.45
2972	Labels—1" White (1000)	9.95 6.75
2989	Lode Runner D	34.95 24.20
2855	Lode Runner R	39.95 27.70
2076	Logo D	69.95 48.80
1886	Master Type D	39.95 27.65
2970	Math Blaster D	49.95 34.60
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0692	Microline 92-P Printer	599.00 CALL
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2875	Miner 2049er R	39.95 30.75
0671	Mirage Data Base Mgr D	89.95 69.25
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1939	Most Amazing Thing D	39.95 27.60
2916	Mule D	40.00 30.75
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2912	Music Const Set D	40.00 30.75
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0650	PI-3 12 in Amber Monitor	249.00 162.00
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2711	Rhymes & Riddles D	29.95 20.75
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2950	Robotron 2084 R	44.95 37.00
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2993	Sargon 2 D	34.95 24.20
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1762	Seafox R	39.95 27.60
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0587	Simons Basic R	24.95 16.05
1416	Smith Corona TP1 Ribbon	7.95 6.35
1937	Snooper Troops #1 D	39.95 27.60

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0374	Solo Flight C	34.95 26.90
2952	Solo Flight D	34.95 26.90
2968	Spider Eater D	29.95 21.95
2725	Star Battle D	24.95 17.30
2935	Star Trek R	39.95 27.60
1881	Starcross D	39.95 27.65
2949	Stargate R	44.95 37.00
1277	Starwriter Film Ribbon	5.50 4.50
1278	Starwriter Nylon Ribbon	5.75 4.65
2715	Story Machine R	39.95 27.65
2250	Supertext Pro D	99.00 66.00
1952	Survivor D	34.95 24.20
1877	Suspended D	49.95 34.50
1843	Sword Of Fargoal C	30.00 20.80
1838	Sword Of Fargoal D	30.00 20.80
0346	Tax Advantage D	69.95 44.85
1259	Taxan 12 in Amber Monitor	189.00 138.65
1258	Taxan 12 in Green Monitor	179.00 131.60
1528	Taxan Color Mnt W/Audio	399.00 305.50
1758	Telengard C	23.00 15.95
0444	Telengard D	28.00 19.40
1842	Temple of Apshai C	40.00 27.70
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1281	Trunk Floppy Storage	29.95 21.50
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0679	Type Tutor/Word Invade D	24.95 17.30
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0015	Wico Redball Joystick	34.95 24.40
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1142	Alien Addition (Home)	34.00 26.75
0013	Alpha Plot	39.50 27.25
2598	Alphabet Zoo	29.95 20.70
0434	Apple Cat 2 Modem	389.00 278.10
0151	Apple Mechanic	29.50 20.35
0309	Applewriter 2 Pre-Boot	24.00 16.95
0090	Appli-Card (6 MHz)	375.00 281.30
0536	Assembly Lines (Book)	19.95 15.35
2905	Axis Assassin	35.00 26.95
0042	Bag of Tricks	39.95 27.65
0501	Bank Street Writer	69.95 48.35
0277	Battle For Normandy	39.95 27.65
0278	Beagle Bag	29.50 20.35
0126	Beagle Basic	34.95 24.20
0658	Beneath Apple DOS	19.95 13.85
0111	Book of Apple Software '84	19.95 12.80
0096	Bookends	125.00 86.40
1676	BPI General Accounting	395.00 273.45
2599	Broadsides	39.95 27.70
0545	Bufferboard-Grapppler	175.00 132.55
1682	Buffered Grapppler + (16K)	239.00 178.00
0448	Bumble Games	39.95 27.65
2805	Business Accountant 2/2E	255.00 196.15
0228	Castle Wolfenstein	29.95 20.70
0734	CDEX How to Use Apple IIE	59.95 41.50
0733	CDEX Visicalc Training	59.95 41.50
0656	Chart-Macintosh	125.00 86.55
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0654	Compu-Read	29.95 20.70
0743	Compu-Spell System	29.95 20.70
0416	Compuserve Starter Kit	39.95 24.35
1138	Computer Sat (Harcourt)	79.95 62.85
1731	Copy 2 Plus	39.95 25.65
1295	Creature Creator	39.95 27.65
2862	Cubit	39.95 27.65
2910	Cut & Paste	50.00 38.50
0777	Data Capture IIE	90.00 62.35
0059	David's Midnight Magic	34.95 24.00
1265	DB Master Version 4	350.00 242.35
0052	Deadline	49.95 34.50
0189	Decathlon	29.95 20.70
0630	Delta Drawing	49.95 34.60
1143	Demolition Division (Home)	34.00 26.75
2951	Dig Dug	34.95 29.10
1722	Disk Boxes (5 Color Coded)	25.00 12.50
2866	Disk Drive Ext Cable	19.75 16.70
2833	Disk Quik	29.50 20.45
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2939	Donkey Kong	34.95 29.10
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0983	Double Take	34.95 24.15
0424	Dow Jones Market Analyzer	350.00 293.75
2877	Drol	34.95 24.20
2600	Eagles	39.95 27.70
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1384	Echo 2 Speech Synthesizer	149.95 125.60
0811	Einstein Compiler	129.00 89.30
0661	Elementary Apple	14.95 10.35
0092	Elephant Disks SS/DD (10)	37.00 24.35
1337	Elephant Disks SS/SD (10)	34.00 21.15
0729	Enhancer II/Function Strip	215.00 161.30
0107	Epson MX-80 Ribbon 2-Pac	28.00 12.55
0029	Essential Data Duplicator	79.95 52.00
0039	Executive Secretary	250.00 173.10
0314	EZ Port II	34.95 24.20

CAT#	LIST	SALE
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2821	Flight Simulator II	49.95 38.05
2918	Flip & File W/Lock (50)	39.95 23.85
1440	Flip-N-File (50 Disks)	29.95 18.85
2796	Fontrix	75.00 64.10
1427	Format II Enhanced	150.00 103.85
0554	Frame-Up	29.50 20.35
1127	Game Show	39.95 31.40
0046	General Manager II	229.95 158.90
0533	Geopolitique 1990	39.95 27.65
0573	Gertrude's Puzzles	44.95 31.15
2843	Global PLE/Beagle Bros	49.95 34.60
0043	Graphics Magician	59.95 41.40
0094	Grapppler +	165.00 128.00
2902	Hardhat Mac	35.00 26.95
2880	Hayes Joystick Mach III	54.95 38.05
2817	Hayes Joystick Mach II	44.95 31.15
1437	Head Cleaning Kit	29.95 17.30
0197	Home Accountant	74.95 48.05
2804	Home Word	49.95 34.60
1684	How To Pgrm In Applesoft	49.95 34.60
1589	In Search Of Amazing Thing	39.95 27.60
2853	Incredible Jack	179.00 123.95
2325	Jane W/Mouse	295.00 204.25
0449	Juggles Rainbow	29.95 20.75
1442	Kindercomp	29.95 20.70
0003	Knight Of Diamonds	34.95 24.20
1693	Koala Graph Tablet—Apple	124.95 83.50
2954	Krell Logo	89.95 81.15
2972	Labels—1" White (1000)	9.95 6.75
2890	Learning Bridge Made Easy	79.95 55.35
1463	Legacy of Lylgamyn	39.95 27.65
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0403	Lisa 2.6	79.95 61.75
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0806	Locksmith 5.0	103.50 77.20
0982	Lode Runner	34.95 24.15
0194	Magic Window 2	150.00 103.85
0192	Master Type	39.95 27.65
0089	Maxell MD1 Disks-SS/DD (10)	51.90 28.75
2901	Memorymaster 2E/64K Exp	169.00 140.85
2147	Micro Cook-Appetizers-2E	12.00 8.50
2146	Micro Cook-Soups/Salads-2E	12.00 8.50
0437	Micro Cookbook	40.00 27.65
2148	Micro Cookbook IIE	40.00 27.65
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1509	Microline Ribbon	3.20 2.20
2958	Microline Tractor Feed	65.00 57.70
2802	Micromodem IIE W/Smartcom I	329.00 246.75
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1135	Minus Mission (Home)	34.00 26.75
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0580	Multiplan (Apple DOS)	250.00 173.10
0655	Multiplan-Mac	195.00 135.00
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0101	NEC 1215 Color Monitor	399.00 333.35
0240	NEC 8023 Printer	499.00 432.90
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2809	PFS Write IIE	140.00 96.95
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0495	Pie Writer 2.2 (40/80)	149.95 103.85
2907	Pinball Const. Set (E.A.)	40.00 30.75
1292	Pkaso-Universal Infrface	175.00 132.60
0659	Power of Visicalc	14.95 10.35
0584	Preschool IQ Builder 1	23.95 16.60
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1279	Prowriter Nylon Ribbon	13.50 4.50
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2111	Ramcard 16K (MPC)	99.00 60.25
0634	Ramcard 16K Microtek	129.00 71.55
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0195	Sanyo 5500 Printer	995.00 728.90
0561	Sat Word Attack Skills	49.00 33.90
1303	Saturn 128K RAM Board	499.00 374.30
0133	Screenwriter II	129.95 89.00
0041	Sensible Speller IV	125.00 86.50
0400	Silicon Salad	24.95 17.25
1416	Smith Corona TP1 Ribbon	7.95 6.35
0465	Snooper Troops 1	44.95 31.15
0138	Softcard	345.00 253.00
0271	Software Automouth	124.95 86.35
0250	Spellagraph	39.95 27.65
1291	Spellicopter	39.95 27.65
0631	Spelling Bee Games	39.95 27.70
0274	Spy's Demise	29.95 20.75
2030	SSM Transend 1	89.00 67.85
2906	Standing Stones	40.00 30.75
1277	Starwriter Film Ribbon	5.50 4.50
0435	Step-By-Step	89.95 62.30
1447	Step-By-Step II	89.95 62.30
0100	Sticky Bear A B C	39.95 27.65
0099	Sticky Bear Numbers	39.95 27.65
0292	Story Machine	34.95 24.20
1374	Sup'r Mod—Universal	69.95 53.05
1445	Supertext Pro (40/80)	175.00 121.15
0001	System Saver	89.95 69.20
1259	Taxan 12 in Amber Monitor	189.00 138.65
1258	Taxan 12 in Green Monitor	179.00 131.60
1528	Taxan Color Mntr W/Audio	399.00 305.50
0236	Terrapin Logo	149.95 103.85
0137	TG Game Paddles	39.95 27.65
0136	TG Joystick W/Toggle	59.95 41.50
1330	TG Joystick W/Toggle IIE	64.95 45.00
1730	The Accountant	99.00 64.10
2597	The Accountant—VCalc Intfc	20.00 15.40
0462	Tip Disk #1	20.00 13.85
1281	Trunk Floppy Storage	29.95 21.50
0544	Typefaces	20.00 13.85
0155	Typing Tutor 2	24.95 17.30
2836	Ultima 3 (Exodus)	54.95 38.05
0559	Ultraterm	379.00 284.30
0072	Ulysses & Golden Fleece	34.95 24.00
0062	Utility City	29.50 20.35
2992	Verbatim DS/DD (10)	46.50 37.20
1721	Verbatim SS/DD Hardpack	35.00 27.60
0093	Verbatim SS/DD Softpack	34.00 26.95
0063	Versaform	389.00 263.00
0361	Versaform Inv. Template	49.95 34.60
0648	Videoterm W/SS & Inverse	319.00 247.05
2900	Viewmaster 80 Column	169.00 140.80
2152	Visible Computer-6502	49.95 46.90
0150	Visicalc (Special)	250.00 172.00
1422	Visicalc IIE (Special)	250.00 172.00
0422	Visicalc Pre-Boot	49.00 33.95
0077	Visitrend/Visiplot	300.00 225.00
1480	Wico Analog Joystick	49.95 38.40
2936	Wildcard 2	139.95 107.10
2937	Wildcard Plus	169.95 130.50
0145	Wizard & Princess	32.95 22.75
0144	Wizardry	49.95 34.60
0984	Wizplus	39.95 27.60
1532	Wizprint	24.95 17.30
0284	Word Handlers Pkg	169.95 117.65
0342	Word Juggler IIE W/Lexicheck	189.00 157.50
0249	Z-80 Plus Board	139.00 124.75
0521	Zaxxon	39.95 27.60
0296	Zork I	39.95 27.60
0141	Zork II	39.95 27.60
0379	Zork III	39.95 27.60

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2658	Alligator Mix	34.00 23.55
0696	Amdek 300A 12in Amber Mon	199.00 161.50
0104	Amdek 300G 12in Green	179.00 143.40
0272	Amdek Color III Monitor	479.00 383.25
0190	AST Comboplus 64K	395.00 296.55
0079	AST Megaplug 64K	395.00 296.55
0594	AST Sixpac Plus 64K	395.00 296.55
0930	ATI-BPI Gen Acctng (PC XT)	75.00 51.90
0918	ATI-Lotus 1-2-3 (PC XT)	75.00 51.90
0924	ATI-Supercalc	75.00 51.90
0925	ATI-Visicalc (PC XT)	75.00 51.90
0919	ATI-Wordstar Vols 1&2	75.00 51.90
2386	Aztec	39.95 27.70
2352	B-1 Nuclear Bomber	21.00 14.55
0952	Bank Street Writer	79.95 55.35
0946	Barron's Study for the SAT	89.95 62.30
1512	BASF Disks SS/DD(10)	35.00 21.40
2546	Basic Compiler	395.00 273.50
2480	Battle For Normandy	39.95 27.70
2962	BMC 13-in RGB Color Mntr	595.00 455.40
2807	Book of IBM Software	19.95 12.80
2813	BPI Accounts Payable	595.00 411.95
2814	BPI Accounts Receivable	595.00 411.95
1068	BPI General Accounting	595.00 411.95
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2812	BPI Payroll	595.00 411.95
2110	BPS Business Graphics	350.00 242.35
2592	Business Basic Compiler	600.00 415.40
2415	C Compiler (MS/DOS)	600.00 415.40
2410	CBasic Compiler (MS/DOS)	600.00 415.40
2370	CDEX Training for Visicalc	69.95 48.45
0971	CDEX Training-PC DOS 2.0	69.95 48.40
0959	CDEX Training-Supercalc	69.95 48.40
0932	Centipede	34.95 29.10
1020	Checkers	49.95 34.60
1019	Chess	69.95 48.40
2775	Computer Baseball	39.95 27.65
2358	Computer Football	21.00 14.55
0433	Copy 2PC	39.95 25.65
2515	CP/M 86	60.00 41.55
2395	Creature Creator	39.95 27.70
2458	Crisis Mountain	35.00 24.25
2553	Crosstalk XVI	195.00 135.00
2426	Curse of RA	20.00 13.85
1043	Dark Crystal Adv #6	37.95 26.25
2571	Data Capture	120.00 83.10
2988	Database Manager II	295.00 204.25
2636	DB Master	595.00 411.95
2593	DBase II (MS/DOS)	700.00 484.65
2344	Deadline	49.95 34.60
2456	Death in the Caribbean	35.00 24.25
0934	Defender	34.95 29.10
2773	Delta Drawing	49.95 34.60
2659	Demolition Division	34.00 23.55
2432	DGraph (MS/DOS)	295.00 204.25
0935	Dig Dug	34.95 29.10
1722	Disk Boxes (5 Color Coded)	25.00 12.50
2984	Disk Boxes—Individual	5.00 2.50
2554	Dollars & Sense	165.00 114.25
0937	Donkey Kong	34.95 29.10
2405	DR Logo (CP/M 86)	149.95 103.85
2357	Draw Poker	21.00 14.55
2746	Early Games Children	29.95 20.75
2747	Early Games Matchmaker	29.95 20.75
2749	Early Games Music	29.95 20.75
2516	Easyspeller II (PC DOS)	225.00 155.80
0995	Easywriter II System	395.00 273.45
2754	Einstein Speller (2 Drive)	149.95 103.80

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Control Data Educational Software To Get NEA Teacher OK

Control Data Corporation, an international computer and financial services firm, and the National Education Association's Educational Computer Service have signed an agreement that brings the giant computer software publisher and teachers together to improve the quality of instructional software being sold to schools.

Control Data has asked the NEA Educational Computer Service to review selected courseware for popular microcomputers prior to publication.

"This venture brings software developers together with teachers, the people who must use the new technology, into a unique business-education partnership," says NEA Executive Director Don Cameron.

"This is a revolution of sorts in education and industry. Finally, teachers' expertise is being brought to bear in the formative stage on materials they and their students will be using in their classrooms. Undoubtedly the result will be educational software that's more useful and relevant to teachers and students."

Robert F. Powell, vice president for academic education at Control Data, calls these pre-release assessments, which involve both teacher and student reviews, one of their final quality assurance checks.

"The software assessments we've received from NEA members have been valuable," he adds, "so we wanted to incorporate them into our review process. The teacher perspec-

tive helps us 'fine tune' our products and produce the very best educational software possible."

Control Data was the first software publisher to offer its products for review by the NEA Educational Computer Service. The Service, a joint project between NEA's National Foundation for the Improvement of Education and Cordatum, Inc., a Maryland computer services firm, has been assessing educational software already on the market for about six months.

Software developers voluntarily submit their products to the NEA Educational Computer Service for evaluation by teachers and technical experts. The reviewers evaluate programs to determine if they are

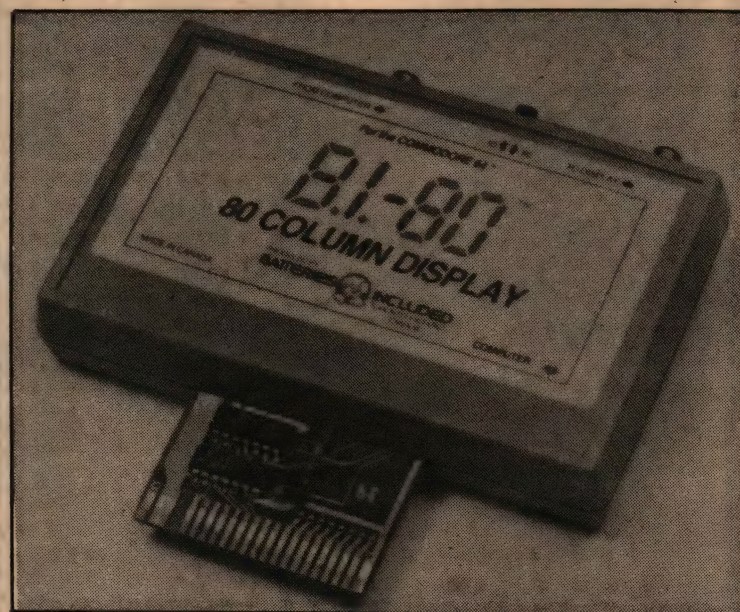
technically reliable, educationally sound, and easy for teachers and students to use. Software that meets these criteria earns the "NEA teacher certified" stamp of approval and is listed in the Service's computer products catalogue.

Out of the more than 1,500 pieces of software that manufacturers have classified as educational, the NEA Educational Computer Service has to

date identified 337 as worthy of full-scale evaluation. Of these 337, which include products from 40 different publishers, the Service has approved 170.

The joint announcement by NEA and Control Data may be the biggest step yet toward getting teachers and software publishers working together to develop more "schoolworthy" products.

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For more information contact: Rick Miller, (714) 979-0920. Batteries Included, 3303 Harbor Boulevard, Suite C-9, Costa Mesa, Ca. 92626.

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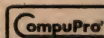
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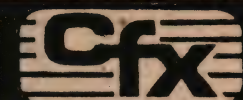
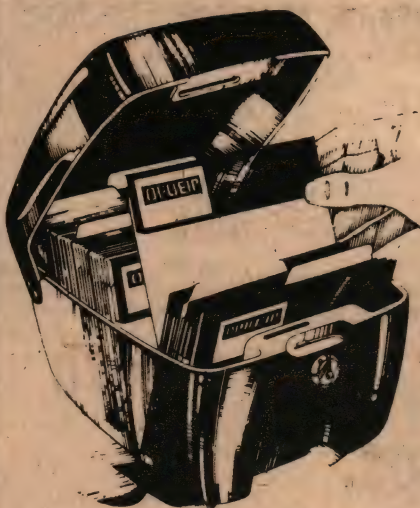
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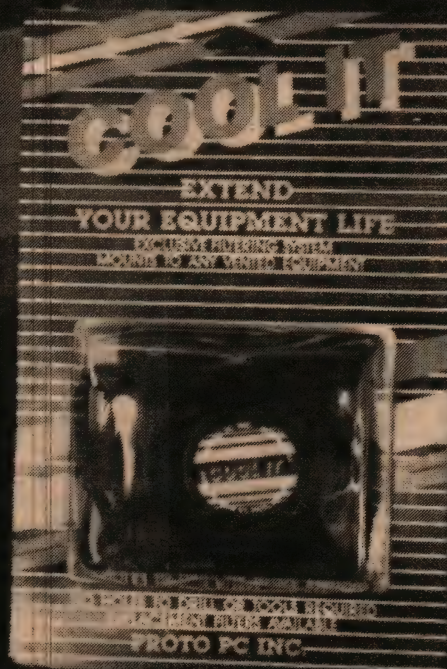
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Speech with high intelligibility and naturalness can be recorded for computer response using the Covox Voice Master. Requiring only about 400 bytes of storage for the average word, up to 64 numbered words or phrases or other sounds can reside in memory for instant recall with simple BASIC commands. Complete vocabularies can be stored on disk or tape to extend the number of available words without limit. It is now possible to devise practical applications for talking computers -- from robot advisories to cockpit announcements to video games - at far less cost than ever before. Based on zero crossings and amplitude information, the unique technique gives good results at bit rates of

under 7000 per second (user selectable). For some computers, the Voice Master device itself is needed only for recording; user created software then functions without any added hardware. Available now for the Commodore 64, Voice Master versions will soon be available for Apple IIe, IBM PC, and other popular makes. Software which extends Voice Master capabilities to word recognition is also scheduled for early release. The retail price of Voice Master with software on disk is \$89.95. For more information contact: Covox, Inc., 675 Conger Street, Eugene, Oregon 97402. (503) 342-1271. Telex 706017 (Av Alarm UD).

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Versaterm II Terminal Program For Commodore 64

ELECTROSHARP announces the release of a new terminal program for the Commodore 64. This program, VERSATERM II, allows the user to upload and download text and programs in ASCII or XMODEM protocol. Downloaded Image files and BASIC listings can be converted into runnable programs. Downloaded data can be saved to tape or disk and dumped to screen or printer. Data can either be downloaded to a 43,000 byte buffer or directly to disk or printer while on line. Data can be uploaded from disk, tape, or keyboard via the 43,000 byte buffer. Phone numbers can be stored, recalled, and automatically dialed when used with the 1650

Automodem. The automatic redial feature will automatically redial a number until contact is made, VERSATERM II allows the user to store, retrieve, and send up to 25 keywords or phrases with a single keystroke. Baud rate, duplex, etc. are menu selectable, and any text/background/border color combination can be selected. VERSATERM II is written in machine language and is available on tape or disk for \$34.95. For more information, call or write for free brochure. ELECTROSHARP 1981 Sandalwood Drive Santa Maria, CA 93455 (805) 922-4095

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EnTech Extends Commodore Music Contest Deadline

EnTech Software has extended the deadline of the First Annual Computer Song Writing Contest to December 1, 1984, because according to EnTech Chairman Ray Soular, "A lot of people who have just recently become aware of the contest have requested more time to enter."

EnTech is offering a grand prize of \$1,000 plus free studio recording time to the best song written on the Commodore 64 with its Studio 64 program. Entries submitted on disk will be judged by a panel of ten music industry professionals,

which at this time includes Vince Flemming of Strangeland Music (ASCAP) and Dan Seitz of Aleph-Baze (BMI).

Soular said that to fill the numerous requests for contest information, EnTech is printing and sending additional contest entry blanks to thousands of retailers across the country. Retailers needing entry blanks can contact the Computer Song Writing Contest, P.O. Box 185, Sun Valley, CA 91353; 818-768-6646.

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We have 8Kx8 static RAMs: HITACHI HM6264P-15, HM6264LP-15, and the TOSHIBA TC5565PL-15. These are 28 pin devices compatible with 2764 EPROMs. Both the Hitachi and Toshiba parts are pin compatible. After a brief discussion by phone with both company offices, we are under the strong impression the Toshiba part is slightly better. Both brands have two chip selects, and go into low power mode when only either chip select is disabled. Both Hitachi devices, the P-15 and LP-15, are the very same part, made the same way at the same time, however, the LP device is culled out or tested as being a lower power device. The Toshiba PL-15 and Hitachi LP-15 appear to have identical specs.

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Software is currently available only for CP/M systems, which supports up to four Quasi-Disk boards in one S-100 system.

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2764	250	ns	HITACHI	8Kx8	@	\$7.97
2532	450	ns	HITACHI	4Kx8	@	\$4.38
2732	450	ns	HITACHI	4Kx8	@	\$5.40
2716-1	350	ns	AMD	2Kx8	@	\$4.56
2716	450	ns	HITACHI	2Kx8	@	\$3.50
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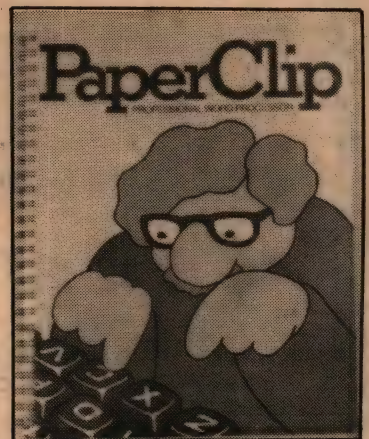
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Fast, simple, and versatile, SpellPack accelerates the per-page rate of checking with each additional page. Additions and corrections are made with single-key commands. This amazing software package, retailing at the suggested \$49.95, can be used with most major word processing programs for Commodore computers.

Improved PaperClip also works with SpellPack™, a special Batteries Included spelling checker program with an internal dictionary of over 20,000 words. Suggested retail price is \$89.95. PaperClip is also available with SpellPack included for \$119.95 retail.

For more information contact: Rick Miller (714) 979-0920. Batteries Included, 3303 Harbor Boulevard, Suite C-9, Costa Mesa, Ca. 92626.

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APPLE

Another Chapter In The Saga Of Lode Runner

The saga of Lode Runner continues when Broderbund released CHAMPIONSHIP LODERUNNER™ in June. This new version of Lode Runner is aimed squarely at the large number of players who have become Lode Runner fanatics since the original 150-level version was introduced in 1983.

CHAMPIONSHIP LODERUNNER contains 50 complex screens that could take even expert Lode Runner players days or weeks to master. By original Lode Runner author Doug Smith, CHAMPIONSHIP LODERUNNER is much more intricate and difficult than the first version. As he points out, any level in CHAMPIONSHIP LODERUNNER will take more ingenuity to complete than the most difficult level in Lode Runner. Timing throughout the game is critical. After completing any single level, a player is rewarded with a special tune. "The player will have earned it", says Smith.

Real fame awaits players who successfully complete the 50th level. At that time a special password keyed to the serial number of the player's CHAMPIONSHIP LODERUNNER

disk will be displayed on the screen. After Broderbund has verified that number, the player's name will be published in major computer magazines.

In CHAMPIONSHIP LODERUNNER, as in the previous version, the player moves his treasure hunter across floors, up and down ladders, hand over hand across bars and through trapdoors to pick up gold, all the while attempting to elude the guards. A player's only weapon is a

laser pistol that can blast holes for trapping guards or for entering closed gold chambers.

Unlike Lode Runner, the championship version does not have the game generator that allows players to construct their own screens. "At this level, player-generation simply doesn't make sense", explains Doug Smith. "It will take all the concentration Lode Runner aficionados have to complete the game as is."

CHAMPIONSHIP LODERUNNER will be available on

disk for Apple II+, IIe, IIC and Commodore 64 computers. Two-button joystick control is optional. Suggested retail price is \$34.95.

For more information about CHAMPIONSHIP LODERUNNER, please contact

Director of Marketing, Broderbund Software, 17 Paul Drive, San Rafael, CA, 94903; (415) 479-1170.

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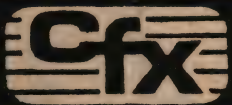
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How Color CRT's Work

by L. Van Delray

Back at the beginning of this series, we discussed the operation of a conventional monochrome (one color, usually white or green on black) cathode ray tube (CRT). In this section, we will discuss the basics of a color CRT.

As we now know, when an

electron beam strikes the phosphor of the CRT, the resulting energy exchange creates a spot of light, whose color is essentially a function of the chemical that makes up the phosphor. Thus, simply by selecting the type of phosphor, the CRT manufacturer can determine the final displayed

color.

Obviously, to create a color image on the CRT we should use a number of electron guns, each aimed at a different colored phosphor... but how many guns, how many different colors, and which ones to use?

To understand the basic of a color CRT, we must learn a little about color. The perception of color is purely psychophysiological. There is no "real" color--the radiations that occur when the electron beam strikes the phosphor produces an optical sensation that we have been taught to associate with a specified color name.

We have all played with a prism. When using this optical device, we notice that when a slender beam of white light (usually sunlight) is passed through the prism, it breaks up into a very pretty rainbow of

colors from violet too deep red (as shown in Figure 1A).

However, if you go the opposite way, that is, if we take some colors and pass them through the prism in the correct proportions, sure enough, a beam of white light will be produced. This is shown in Figure 1B.

Interestingly enough, experiments prove that white light can be produced by using the right proportion of only three colors--as long as a mixture of two cannot be used to produce the third. The three so-called "primary" colors selected were red, green, and blue.

There are two basic ways to combine three colors to create a panoply of other colors including white. These are called "subtractive" (used in printing) and "additive" (light emitting and as used in color TV).

Since we are dealing with color-TV, let us look at additive colors. Figure 2 shows that a brightness combination of red (30%), green (59%), and blue (11%) can be combined to form other colors including white.

Thus, the CRT manufacturer has to create a CRT having three electron guns--one for each color--with each gun "aimed" at its pertinent color emitting phosphor affixed to the rear of the faceplate of the CRT.

Although CRT manufacturers use different types (and numbers) of electron guns and may lay their color emitting phosphors down in different patterns, the CRT operation is essentially the same. This discussion will use the old standby--the shadow-mask and color-triad approach to explain CRT operation.

(By the way, if you use a magnifying glass to look at the operating screen of a color-TV receiver, or video color monitor in operation, you will see the color-phosphor triad arrangement, and how they glow

Continued on page 80

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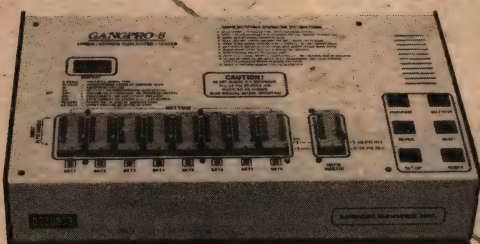
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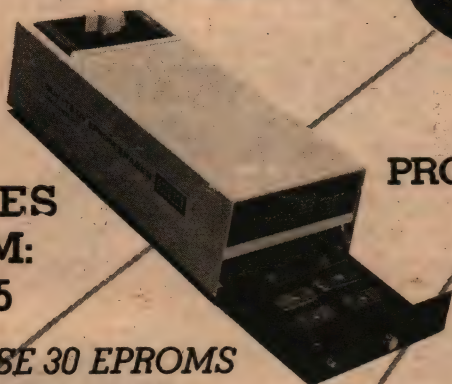
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Color CRT's

Continued from page 78

to produce the required color. If you do not have a magnifying glass, sprinkle a few drops of water on the screen and look through one of the droplets to see the phosphor action.)

A shadow-mask is essentially a large metal sheet having several hundred thousand small holes, mounted just in front of the phosphor color-triads affixed to the glass faceplate of the CRT. A color-triad is a trio of three color (red, green, blue) phosphor dots just touching each other. Figure 3A shows the relationship between one hole in the metal shadow-mask and its associated three color phosphors (called a "triad"). Note that the metal hole is "aimed" at the junction of the three phosphors.

The relationship between the three electron guns, a single shadow-mask hole, and its associated three phosphor dots is shown in Figure 3B. Note that in the interests of simplicity, the latter illustration shows the phosphor triad as three vertical phosphor dots.

The electron beam from each color gun is passed through the hole in the shadow-mask in such a manner that it is aimed only at its color phosphor. The several hundred thousand holes in the shadow-mask and their associated color triads cover the entire screen area on the interior side of the CRT faceplate. Thus, as each color

gun is "modulated" by its pertinent color video signal, its associated color phosphor glows.

For example, if only the red gun is driven, then only the red phosphor will glow producing a red image. If only the green gun is activated, only a green image will be seen, and obviously, if only the blue gun is driven, only a blue image will appear. If each, or all, of the three guns are turned on proportionally, as shown in Fig. 2, a number of colors, including white, can be seen.

The full explanation of color theory and how all colors can be created is a little too long for this article, so the reader is urged to obtain library books on color-TV and read.

When it comes to creating an image on the entire raster of the color CRT, another problem pops up—a problem called "convergence."

As shown in Figure 4, the three electron beams can be made to "converge" (brought to a fine point) only at the direct center of the CRT screen. Since the phosphor-coated glass faceplate of the CRT is essentially flat, and the locus of the convergence is essentially hemispheric (with the center at the sweep center of the yoke), the three beams go out of convergence (misconvergence) when they leave the approximate center of the screen. This action will produce a clear image at the middle of the screen, and a

fuzzy image where the three beams spread out away from the center.

To make proper convergence take place away from the center, a special signal is created within the vertical and horizontal sweep circuits and applied to a small yoke—called the convergence coil—which like the sweep yoke is also mounted on the neck of the CRT. The vertical and horizontal convergence signals cause the three beams to properly converge all over the CRT screen.

The vertical and horizontal convergence current levels are determined by a set of six (usually color-coded) manually operated potentiometers, usually located behind a safety door on the TV or color monitor. These adjustments should be made only by a knowledgeable technician because when wrongly adjusted, they can cause a blurry chromatic image to be seen all over the CRT screen.

Since the reference point for all convergence is that each electron gun illuminate only the particular color phosphor associated with it, a set of adjustable convergence magnets are also arranged around the neck of the CRT.

To adjust these "purity" magnets, two of the three electron guns are turned off, and the magnets are adjusted until the screen is glowing only in the color of the remaining "on" gun. Each gun color is adjusted in turn. Once the screen is "pure", a special video test pattern is applied to help adjust the convergence coils via their potentiometers.

The color signal is made up of three components—hue, saturation, and brightness. These are shown in Figure 5.

Hue is the color spectrum that can be produced by the various combinations of the red, green, and blue electron guns.

Saturation is the amount of color seen. For example, when the red gun is turned on, the point of impact is full red. However, it is possible to turn on the other two guns so that as the resulting combination goes towards white, the pure red is diluted to form pink or any other pastel shade between full red and white.

Note that both hue and saturation are functions of the color elements within the CRT.

The third component, brightness, is actually the total brightness—without color—of each spot on the CRT and ranges between full white and full black. It is this brightness component that allows a color signal to be seen in various shades of gray on a monochrome CRT.

Probably the next question

asked is "How do they put the color signal into an already full 4.2 MHz bandwidth signal?"

The answer to this is that the "full 4.2-MHz bandwidth" is not full, and in fact almost half of this bandwidth is devoid of any signals.

Part of the reason for this is shown in Figure 6A. There is a little more to it than what we will discuss, but we are only covering the basics in these articles.

When a black-and-white picture is scanned, the resulting signal distribution clusters around the frame (30 Hz) and the line (15,750 Hz) scanning frequencies. Note that most of the gap between harmonics of the 15,750-Hz line frequency is essentially empty as shown in Figure 6.

There are more harmonics than those shown, but their signal power is greatly reduced, so that their effect is negligible.

Engineering tests show that it is possible to "interleave" another set of signals in the empty gap between line scans without each disturbing the other. This other set of signals is the color, or chrominance, signals.

To perform the interleaving, the chrominance carrier is selected to fall on an odd multiple of one-half the line scan. After considerable field testing, it was found that using a chroma subcarrier of 3,579,545 Hz (3.58 MHz for short), which is the 455th harmonic of one-half the line frequency, did the job.

The chroma signals, interleaved with the sync pulses in what is called "composite video", is applied to the input of a color video monitor. To extract the chroma signal from the composite, and make sure that it is in the proper phase, a special 8-cycle color "burst" is inserted on the horizontal sync pulse backporch as shown in Figure 6B.

This burst is gated off the signal by special circuits within the color-TV or color video monitor, and is used to help recreate the same colors that were applied to the original video signal.

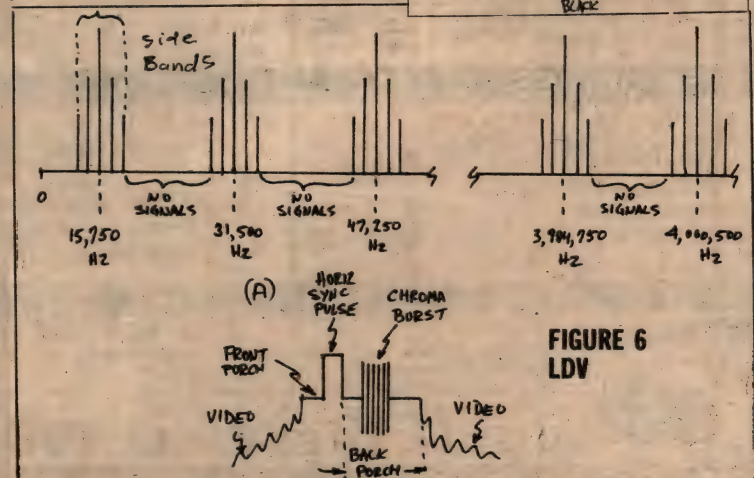
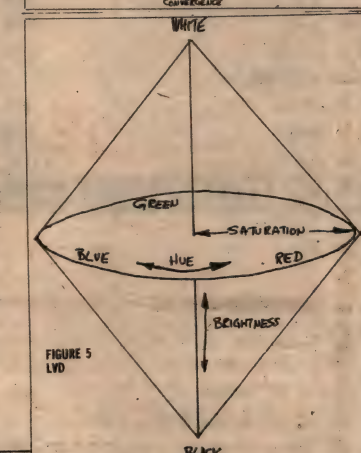
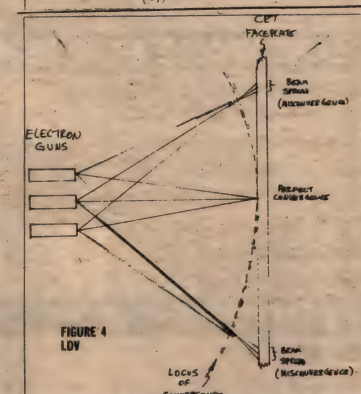
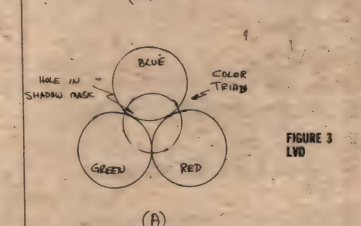
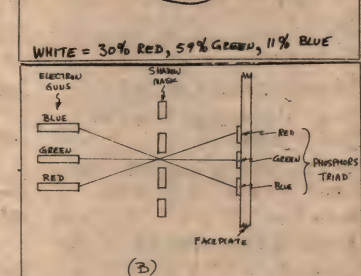
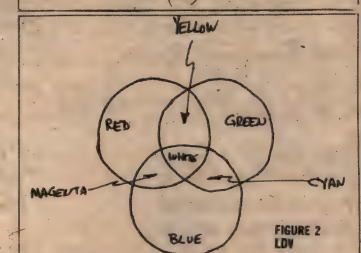
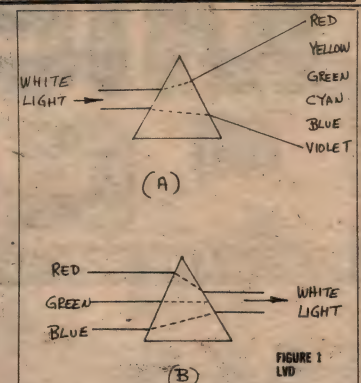


FIGURE 6 LVD

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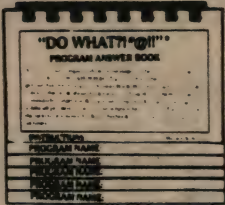
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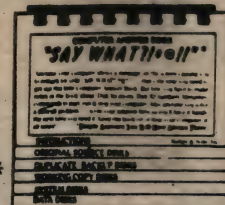
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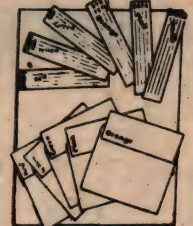
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DATA

20-Orange

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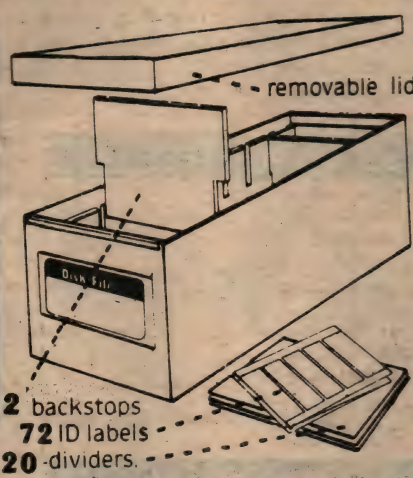
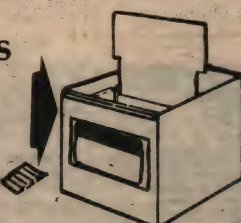
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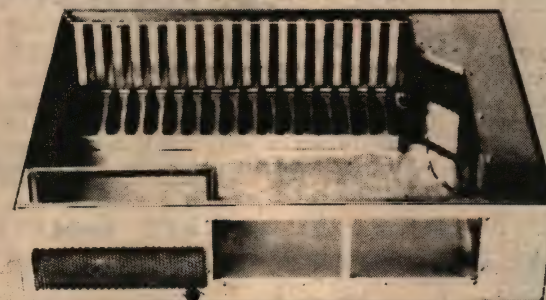
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Don Lancaster Explains Addressing Modes

MEMORIES ARE MADE OF THIS
By Don Lancaster
The conclusion of this article was scheduled for this issue; however, it will be held until the October issue.

THE PACKAGE TO ALBUQUERQUE

How would you go about getting a package to Albuquerque?

There are lots of ways to get a package to Albuquerque. Speed, cost, reliability, protection, convenience, weight - all these things enter into your choice of how to ship a package. For instance...

DOING IT:

How would you get each of the following to Albuquerque?

- () A jar of peanut butter
- () 50 pounds of peanut butter for a small bakery
- () 50 tons of peanut butter for a candy factory
- () A gasket for routine farm machinery maintenance
- () A similar gasket for a hospital's only kidney dialysis machine that failed suddenly
- () A tin of corned beef hash

- () A kilo of Lebanese hash
- () A live giraffe
- () 1000 marbles
- () 1000 Krugerrands
- () 1000 cubic feet of helium
- () An idea

What is good for one package is clearly ungood for another. Where you are shipping something can also lead to big differences...

DOING IT:

How would you ship a barge of coal from

- () Pittsburgh to Cincinnati?
- () Amarillo to Albuquerque?

From Pittsburgh, we simply cut the rope and float the whole works down the Ohio

River. Simple, convenient, and cheap.

From Amarillo - let's see now. First we borrow every skateboard in Texas and neatly lay them all out on I-40. Then we find some... But what about that long hill down Sandia Pass? As long as they aren't too particular about exactly where in Albuquerque we deliver the coal, it just might work. But clearly there are better ways.

Microcomputers also offer lots of ways to get a package to Albuquerque. There are many different methods you can use

to get to a certain location in the address space or to access a certain working register. We call these methods address modes...

ADDRESS MODE—Any method a microprocessor uses to access a working register or reach a certain location in the address space.

Much of the richness and variety of the different micro families comes from the different address modes available. Some micros have only a few address modes; others have over a dozen. Some modes are everyday plain vanilla things; others are extra powerful.

Which address mode do you use? The answer is the same as how you get your package to Albuquerque.

It depends.

The main differences between available address modes are in their length, their speed, and what they can reach...

Address modes differ in how many bytes they need, how fast they work, what they can get at, and how convenient they are to use.

Not all address modes are available on all micros. But almost any task can be done on a micro using some combination of the available address modes.

There are lots of tradeoffs here. Sometimes, you can pick any one of a handful of different address modes. Other times, only one will do, or else one will do the job far better than any other. In general, you try to make your program as short as possible and try to get it to run as fast as possible.

Continued on page 85

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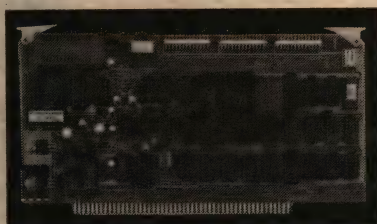


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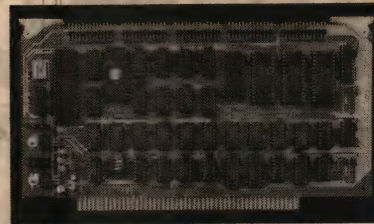


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Addressing Modes Continued from page 84

These two goals are usually opposed to each other, for anything you do to shorten your code may lengthen how long it takes to do the job....

Usually, you want to make your programs as short and as fast as possible.

Operating speed and program length tend to fight each other, so different address modes are available for horse trading.

One classic example is a loop. Say something needs to be done ten times. By looping the same code ten times over, you can shorten the program almost to a tenth of its "brute force" form. But each trip through the loop means unavoidable loop overhead that takes time. As we said, short code often equals long execution times and vice versa.

Each manufacturer has its own name for its address modes, and there's lots of PR fluff to make the modes sound better than they really are. Sometimes one mode may be split up several ways to make the machine sound more powerful.

When you remove the flack, most microprocessors use combinations or variants of only seven basic address modes. It is up to you to sort out what these modes are, how they are used, and what's really behind the name used for each mode.

To repeat, there are different address modes because each mode does one particular job better than the others; and there are lots of tradeoffs involved in writing a program that is both short and fast.

Let's pretend we have a general and universal microprocessor that doesn't have strange names for its address modes. Let's also try to relate each mode to something in the real world and see where we get to. Then we'll sum everything up in a handy address mode reference chart.



You just got home, and there, sharpening its claws on your best hi-fi speaker grille, was the cat.

Now, exactly what you say probably isn't printable, but it will be short and to the point, leaving no doubt whatsoever which cat and which speaker

grille you are referring to.

The simplest microcomputer addressing mode does the same thing. It is short, obvious, and leaves no doubt what is to be done where. This is called implied addressing...

IMPLIED ADDRESSING—An address mode where it is completely obvious what will happen where, without any further information needed.
An implied instruction usually needs only one byte of op code.

For instance, we now know we have carry flags in most micros. A command to "clear the carry flag," often shortened to the mnemonic CLC, will clear the flag for us.

On a CLC command, the carry flag gets cleared. There is no question about which flag or what we are going to do to the flag.

Register moves and transfers are other examples of implied addressing. The command MOVBC moves a copy of working register B into working register C and destroys anything old left in C. The command TXY transfers a copy of register X into Y. These actions are pretty much the same. Only the name changes from micro family to family.

The big advantage of implied addressing is that it is short and sweet. One single byte is needed for a command

and that is all there is to it. Any task that can be done without any further information lends itself to implied addressing.

The big disadvantage of implied addressing is that it is usually limited to manipulation of working registers or housekeeping actions. There is no way to nail down a specific location in the address space with implied addressing. Nor is there a way to answer "with what," "from where," "to where," or "how much."

Address modes will differ through their op codes. A different command will be used for each and every different address mode that a micro can handle, even if the commands may end up doing nearly the same thing.

The symbol for an implied addressing mode is just the mnemonic, and nothing more...

An implied addressing mode is shown by the mnemonic only. Nothing else is needed....

CLC

Let's look at some more examples of implied addressing...

Continued on page 86

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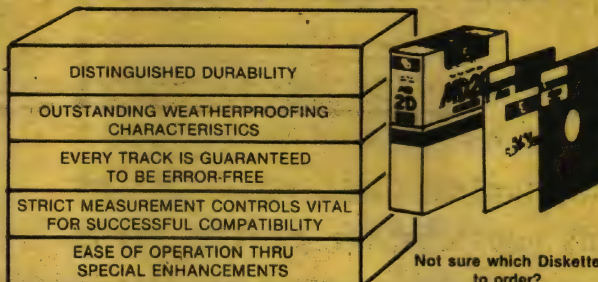
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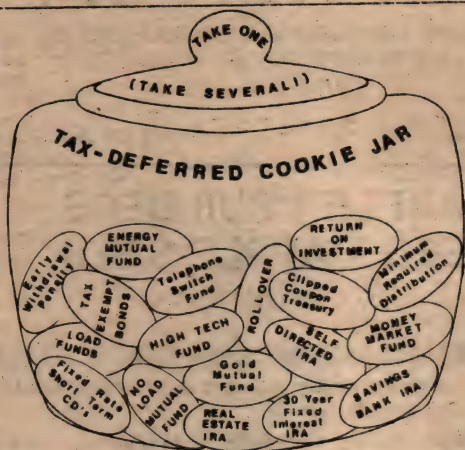
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Addressing Modes Continued from page 85

TYPICAL IMPLIED COMMANDS -

BRK—Break, or do a software interrupt for debugging.
CIA—Clear the accumulator, or reset it to zero.
CLC—Clear the carry flag.
NOP—No operation. Go on to the next step.
MOVBC—Move a copy of the contents of B to C.
PIA—Push a copy of the accumulator onto the stack.
PLA—Pull off what is on the top of the stack and put it into the accumulator.
RORA—Take what is in A and rotate the bits all one to the left.
RORA—Take what is in A and rotate the bits all one to the right.
RTI—Return from an interrupt to wherever you left off before.
RTS—Return from a subroutine to wherever you were before.
SEC—Set the carry flag.
TAX—Transfer a copy of the contents of A to Y.

This assortment of op codes is from several micro families, but you get the idea. Any action that can be done without any further help uses the implied addressing mode.

Implied addressing commands are usually the fastest available for a given micro. Since no further information is needed, the micro can right now go and do whatever has to be done. Thus, implied addressing is usually both the fastest and the shortest way to get a job done.

However, there are a very

few implied addressing commands that may take a long time to execute, perhaps even longer than any other command in any other mode. In these special cases, a single command starts the micro off on a long song and dance routine. Returning from an interrupt is one example. The micro has to look around in the stack to find out where to return to. It then has to get some flags off the stack and finally has to pick up where it left off. All these details take time, even though one simple command is all it takes to start the routine.

Returning from a subroutine and generating a software-controlled break are other examples of implied commands that take a long time. But remember that these are exceptions. Most implied commands are very fast and very short.

Generally, you'll find bunches of implied op codes in any micro family. These get used any time and any place they will work. Practically all of your service and housekeeping commands will use the implied addressing mode.

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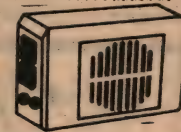
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Gibson Light Pen System Available For New Apple® IIc Home Computer

Koala Technologies Corp. has announced that its Gibson Light Pen hardware and software system will be available for the new Apple IIc transportable home computer.

Koala's Gibson Light Pen system is one of the most ad-

vanced on-screen pointing utilities on the computer market. It includes the Gibson Light Pen and four icon-based software programs that bring a new range of graphics capabilities to computer users of all ages and levels of

expertise.

In addition to the new Apple IIc, the Koala system also is available for the Apple II, IIe and II+ personal computers and will be available for the IBM Personal Computer, IBM PCjr, and Commodore computers in the future.

The Gibson Light Pen is a hand-held pointing device connected to a computer by a

cable. A user can manipulate and move objects on the computer screen by touching the top of the light pen to the screen, thus bypassing the keyboard for many functions. Koala's pen was developed by designer Steve Gibson, who has developed software products for Atari.

Under a previously-reported agreement, Koala has exclusive

worldwide rights to manufacture, market, and distribute the Gibson Light Pen.

Advanced Light Pen Software

Four icon-based light pen software programs developed by Koala will be available for the new Apple IIc. They are:

- * **PenPainter**, a full-color drawing program that includes geometric shapes and patterns. PenPainter can be used in freehand or computer-assisted modes.

- * **PenDesigner**, an easy-to-use pre-drawn symbol library that lets the user create detailed line drawings for engineering, architectural, business, and graphic design applications.

- * **PenAnimator**, a basic introduction to computer graphics animation.

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In addition, Gibson has developed the **PenTrak** language system, which enables the user to include the Gibson Light Pen in custom programs.

Koala's Gibson Light Pen can be used in any application where a pointing device is necessary. It is similar to the popular **KoalaPad**, a lightweight, hand-held tablet that serves as a sketch pad or a custom keyboard. With the **KoalaPad**, however, a user draws on the tablet with a finger or stylus and the resulting image appears on the computer's video display.

Price and Availability

Koala's Gibson Light Pen system is available immediately for the Apple II, IIe, and II+ computers and will be available in the third quarter this year for the new Apple IIc. The system has a suggested retail price of \$249.

Koala Technologies Corp., of Santa Clara, develops and markets innovative products that make personal and home computers easy to use. The company's proprietary software products utilize hardware alternatives to standard computer keyboards which can be used in many applications with a wide range of personal computers to meet specific consumer needs.

For more information contact Koala Technologies Corp., 3100 Patrick Henry Drive, Santa Clara, CA 95052-8100; (408)986-8866.

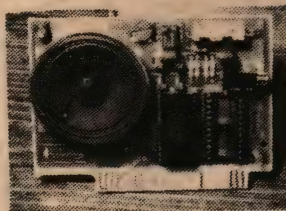
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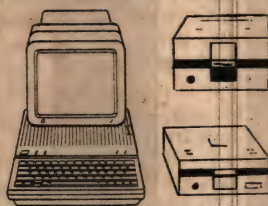
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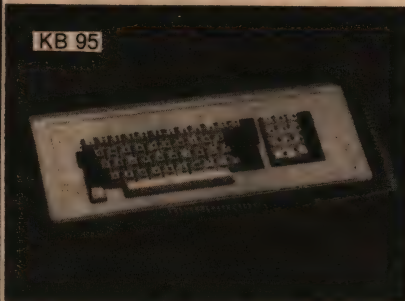
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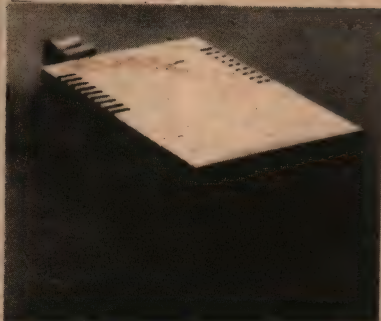
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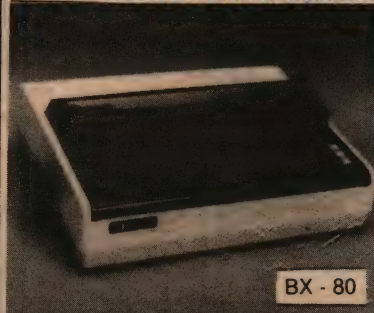
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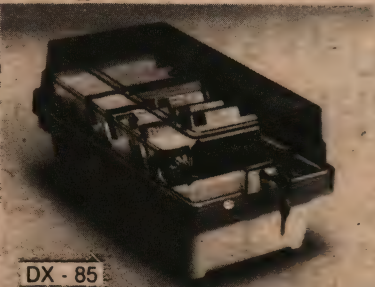
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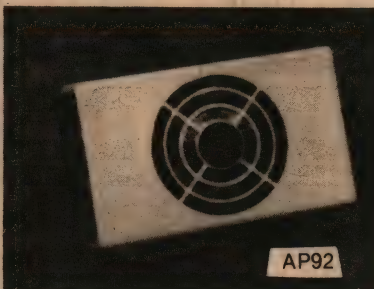
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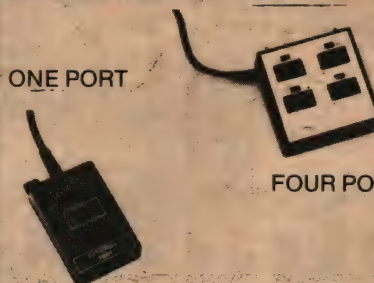
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MacTerminal, Data Communications Software For The Macintosh

Apple Computer has introduced MacTerminal, a data communications software package that allows the Macintosh(tm) personal computer to

interact with mainframe and minicomputers as well as commercial electronic information services. The company showed the product at the 1984 Na-

tional Computer Conference.

The software provides Macintosh users with access to the vast amount of information that businesses and colleges store on large computers. MacTerminal, available in late August, is compatible with a variety of the most widely used communications protocols.

• In business settings MacTerminal can be used to emulate IBM 3278 terminals when linked to a mainframe computer through either AppleLine, a coaxial attachment unit; or the Apple Cluster Controller, a protocol converter that emulates IBM 327x-type cluster controllers.

• Used with an Apple modem or other compatible modem, it provides asynchronous communications through VT100, VT52, and TTY terminal emulation.

• Users also can use a modem and MacTerminal to gain access to remote information services such as CompuServe(tm), The Source(tm), Dow Jones News/Retrieval Service, MCI Mail, and Western Union Easy Link.

MacTerminal runs on either the Macintosh or on Lisa(tm) 2, 2/5, or 2/10 computers using MacWorks, the Macintosh Operating System for the Lisa 2 family.

MacTerminal offers some of the most popular and useful features found on other data communications products. In addition, it enables users to easily exchange information with other Macintosh software by quickly and automatically converting data to a compatible format and eliminating the complicated steps associated with this process on other types of personal computers.

MacTerminal shares the basic characteristics of other Macintosh software—a visual

Continued on page 94



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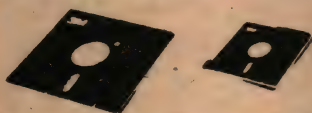
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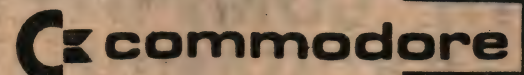
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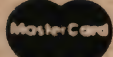
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MacTerminal

Continued from page 90

user interface, integration between applications, a mouse, and the ability to view multiple objects on the screen.

The product currently is integrated with MacWrite and Microsoft Corporation's Multiplan spreadsheet program, enabling users to copy

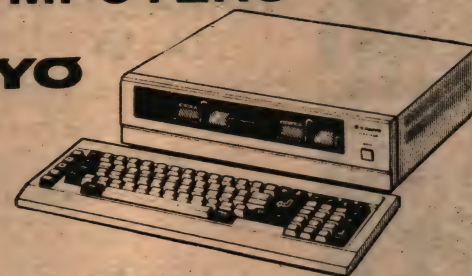
and paste between the applications. Users, for instance, can dial into CompuServe, copy the information they need, open a Multiplan document and paste the information into the spreadsheet. MacTerminal also will be integrated with future Macintosh applications.

MacTerminal features a file transfer capability which facilitates the transfer of text

and graphics to Macintoshes or Lisas in different locations. For example, an architect needing to send a floor plan created on MacPaint to a colleague in another part of the country simply selects the "send file" option from the pull-down menu to initiate the transfer.

Continued on page 96

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SUPER SANYO SYSTEMS

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2A: Includes - Micropro Infostar (a Database program), Micropro Spellstar (a spelling checker for Wordstar), and Micropro Mailmerge (a program for making templete letters for mailing lists, mailing labels, etc.)

2B: Includes - IUS Easywriter II (a Wordprocessor), IUS Easyplanner (a Spreadsheet program), IUS Easyfiler (a Database Program), and IUS Easymailer (a program for making templete letters for mailing lists, labels, etc.)

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FD55A Disk Drives	\$140	MBC232 - RS232 I/F	\$99
PR5500 Sanyo Printer	\$740		

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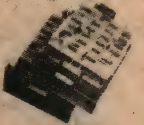
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MacTerminal Continued from page 94

The floor plan then appears as a document on the receiving architect's screen where it can

be re-worked or printed out as needed.

In its terminal emulation mode, MacTerminal eliminates the multiple keystrokes normally needed to call up

functions specific to main-frame applications. Instead, it provides a graphic pull-down menu that displays specific function keys. The user simply opens the menu and uses the mouse to point to and select the right key. The pull-down menu displays appropriate keys for both VT100 and IBM 3278 terminal emulation.

MacTerminal has a suggested retail price of \$99 and will be available through authorized Apple dealers.

For further information contact: Apple Computer, Inc. (408) 973-3714.

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The system requirements for the HIGH-TECH analysis program include the Apple II or compatible computer with 48k memory two disk drives. (Dot matrix printer with grappler and phone modem, optional.) The suggested list price is \$395.

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#1 Rating
(Spreadsheet Configuration)
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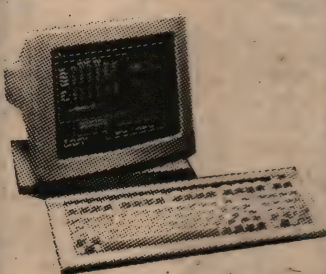
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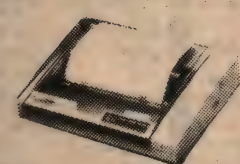
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NEC 3530	\$1279
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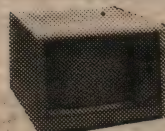
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COLOR MONITORS

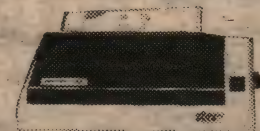
Princeton HX-12	\$489
Zenith ZVM-133	\$449
Amdek Color 1	\$274
Roland CB-141	\$319



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STATIC RAMS

2101	256 x 4 (450ns)	1.95
5101	256 x 4 (450ns) (cmos)	3.95
2102-1	1024 x 4 (450ns)	.89
2102L-4	1024 x 1 (450ns) (LP)	.99
2102L-2	1024 x 1 (250ns) (LP)	1.45
2125	1024 x 1 (45ns)	2.95
2111	256 x 4 (450ns)	2.49
2111L	256 x 4 (250ns) (LP)	2.95
2112	256 x 4 (450ns)	2.99
2114	1024 x 4 (450ns)	8/9.95
2114-24	1024 x 4 (250ns)	8/10.95
2114L-4	1024 x 4 (450ns) (LP)	8/12.95
2114L-3	1024 x 4 (300ns) (LP)	8/13.45
2114L-2	1024 x 4 (200ns) (LP)	8/13.95
TC5514	1024 x 4 (650ns) (cmos)	4.95
2147	4096 x 1 (55ns)	4.95
TMS4044-4	4096 x 1 (450ns)	3.49
TMS4044-3	4096 x 1 (300ns)	3.99
TMS4044-2	4096 x 1 (200ns)	4.49
UPD410	4096 x 1 (100ns)	3.95
MK4118	1024 x 8 (100ns)	9.95
TMM2016-200	2048 x 8 (200ns)	4.15
TMM2016-150	2048 x 8 (150ns)	4.95
TMM2016-100	2048 x 8 (100ns)	6.15
HM6116-4	2048 x 8 (200ns) (cmos)	4.75
HM6116-3	2048 x 8 (150ns) (cmos)	4.95
HM6116-2	2048 x 8 (120ns) (cmos)	8.95
HM6116LP-4	2048 x 8 (200ns) (cmos) (LP)	5.95
HM6116LP-3	2048 x 8 (150ns) (cmos) (LP)	6.95
HM6116LP-2	2048 x 8 (120ns) (cmos) (LP)	10.95
TC5516	2048 x 8 (250ns) (cmos)	9.95
TMS4016	2048 x 8 (200ns)	6.95
Z-6132	4096 x 8 (300ns) (Qstat)	34.95
HM6264P-15	8192 x 8 (150ns) (cmos)	39.95
HM6264LP-15	8192 x 8 (150ns) (cmos)	49.95

LP = Lower Power Qstat = Quasi-Static

DYNAMIC RAMS

TMS4027	4096 x 1 (250ns)	1.99
2107	4096 x 1 (200ns)	1.95
MM5280	4096 x 1 (300ns)	1.95
TMS4060	4096 x 1 (300ns)	1.95
UPD411	4096 x 1 (300ns)	1.95
TMS4050	4096 x 1 (300ns)	1.95
MK4108	8192 x 1 (200ns)	1.95
MM5298	8192 x 1 (250ns)	1.85
4116-300	16384 x 1 (300ns)	8/11.75
4116-250	16384 x 1 (250ns)	8/7.95
4116-200	16384 x 1 (200ns)	8/12.95
4116-150	16384 x 1 (150ns)	8/14.95
4116-120	16384 x 1 (120ns)	8/29.95
2118	16384 x 1 (150ns) (5v)	4.95
MK4332	32768 x 1 (200ns)	9.95
4164-200	65536 x 1 (200ns) (5v)	5.44
4164-150	65536 x 1 (150ns) (5v)	5.44
4164-120	65536 x 1 (120ns) (5v)	8.95
MCM6665	65536 x 1 (200ns) (5v)	8.95
TMS4164	65536 x 1 (150ns) (5v)	8.95
TMS4416	16384 x 4 (150ns) (5v)	9.95
41256-150	262144 x 1 (150ns) (5v)	54.95
41256-200	262144 x 1 (200ns) (5v)	49.95

5v = Single 5 volt supply

EPROMS

1702	256 x 8 (1us)	4.50
2708	1024 x 8 (450ns)	3.95
2758	1024 x 8 (450ns) (5v)	5.95
2716-6	2048 x 8 (650ns)	2.95
2716	2048 x 8 (450ns) (5v)	3.95
2716-1	2048 x 8 (350ns) (5v)	5.95
TMS2516	2048 x 8 (450ns) (5v)	5.50
TMS2716	2048 x 8 (450ns)	7.95
TMS2532	4096 x 8 (450ns) (5v)	5.95
2732	4096 x 8 (450ns) (5v)	4.95
2732-250	4096 x 8 (250ns) (5v)	8.95
2732-200	4096 x 8 (200ns) (5v)	11.95
2732A-4	4096 x 8 (450ns) (5v) (21vPGM)	6.95
2732A	4096 x 8 (250ns) (5v) (21vPGM)	9.95
2732A-2	4096 x 8 (200ns) (5v) (21vPGM)	13.95
2764	8192 x 8 (450ns) (5v)	6.95
2764-250	8192 x 8 (250ns) (5v)	7.95
2764-200	8192 x 8 (200ns) (5v)	19.95
TMS2564	8192 x 8 (450ns) (5v)	14.95
MCM68764	8192 x 8 (450ns) (5v) (24pin)	39.95
MCM68766	8192 x 8 (350ns) (5v) (24pin)	42.95
27128-30	16384 x 8 (300ns) (5v)	29.95
27128	16384 x 8 (250ns) (5v)	34.95

5v Single 5 Volt Supply 21vPGM Program at 21 Volts

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2.0	2.95
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2.4576	2.95
3.2768	2.95
3.579545	2.95
4.0	2.95
5.0	2.95
5.0688	2.95
5.185	2.95
5.7143	2.95
6.0	2.95
6.144	2.95
6.5536	2.95
8.0	2.95
10.0	2.95
10.738635	2.95
14.31818	2.95
15.0	2.95
16.0	2.95
17.430	2.95
18.0	2.95
18.432	2.95
20.0	2.95
22.1184	2.95
32.0	2.95

CMOS

4000	.29	4528	1.19
4001	.25	4531	.95
4002	.25	4532	1.95
4006	.89	4538	1.95
4007	.29	4539	1.95
4008	.95	4541	2.64
4009	.39	4543	1.19
4010	.45	4553	5.79
4011	.25	4555	.95
4012	.25	4556	.95
4013	.38	4581	1.95
4014	.79	4582	1.95
4015	.39	4584	.75
4016	.39	4585	.75
4017	.69	4702	12.95
4018	.79	74C00	.35
4019	.39	74C02	.35
4020	.75	74C04	.35
4021	.79	74C08	.35
4022	.79	74C10	.35
4023	.29	74C14	.59
4024	.65	74C20	.35
4025	.29	74C30	.35
4026	1.65	74C32	.39
4027	.45	74C42	1.29
4028	.69	74C48	1.99
4029	.79	74C73	.65
4030	.39	74C74	.65
4034	1.95	74C76	.80
4035	.85	74C83	1.95
4040	.75	74C85	1.95
4041	.75	74C86	.39
4042	.69	74C89	4.50
4043	.85	74C90	1.19
4044	.79	74C93	1.75
4046	.85	74C95	.99
4047	.95	74C107	.89
4049	.35	74C150	5.75
4050	.35	74C151	2.25
4051	.79	74C154	3.25
4053	.79	74C157	1.75
4060	.89	74C160	1.19
4066	.39	74C161	1.19
4068	.39	74C162	1.19
4069	.29	74C163	1.19
4070	.35	74C164	1.39
4071	.29	74C165	2.00
4072	.29	74C173	.79
4073	.29	74C174	1.19
4075	.29	74C175	1.19
4076	.79	74C192	1.49
4078	.29	74C193	1.49
4081	.29	74C195	1.39
4082	.29	74C200	5.75
4085	.95	74C221	1.75
4086	.95	74C244	2.25
4093	.49	74C373	2.45
4098	2.49	74C374	2.45
4099	1.95	74C901	.39
14409	12.95	74C902	.85
14410	12.95	74C903	.85
14411	11.95	74C905	10.95
14412	12.95	74C906	.95
14419	7.95	74C907	1.00
14433	14.95	74C908	2.00
4502	.95	74C909	2.75
4503	.65	74C910	.95
4508	1.95	74C911	.85
4510	.85	74C912	.85
4511	.85	74C914	1.95
4512	.85	74C915	1.19
4514	1.25	74C918	2.75
4515	1.79	74C920	17.95
4516	1.55	74C921	15.95
4518	.89	74C922	4.49
4519	.39	74C923	4.95
4520	.79	74C925	5.95
4522	1.25	74C926	7.95
4526	1.25	74C928	7.95
4527	1.95	74C929	19.95

UARTS

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AY3-1015	6.95
PT1472	9.95
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MC3480	9.00
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95H90	7.95
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2513-002 LOW	9.95

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MM5369-EST	4.25
MM5375	4.95
MM58167	12.95
MM58174	11.95
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74LS03	.25	74LS181	2.15
74LS04	.24	74LS189	8.95
74LS05	.25	74LS190	.89
74LS08	.28	74LS191	.89
74LS09	.29	74LS192	.79
74LS10	.25	74LS193	.79
74LS11	.35	74LS194	.69
74LS12	.35	74LS195	.69
74LS13	.45	74LS196	.79
74LS14	.59	74LS197	.79
74LS15	.35	74LS221	.89
74LS20	.25	74LS240	.95
74LS21	.29	74LS241	.99
74LS22	.25	74LS242	.99
74LS26	.29	74LS243	.99
74LS27	.29	74LS244	1.29
74LS28	.35	74LS245	1.49
74LS30	.25	74LS247	.75
74LS32	.29	74LS248	.99
74LS33	.55	74LS249	.99
74LS37	.35	74LS251	.59
74LS38	.35	74LS253	.59
74LS40	.25	74LS257	.59
74LS42	.49	74LS258	.59
74LS47	.75	74LS259	2.75
74LS48	.75	74LS260	.59
74LS49	.75	74LS266	.55
74LS51	.25	74LS273	1.49
74LS54	.29	74LS275	3.35
74LS55	.29	74LS279	.49
74LS63	1.25	74LS280	1.98
74LS73	.39	74LS283	.69
74LS74	.35	74LS290	.89
74LS75	.39	74LS293	.89
74LS76	.39	74LS295	.99
74LS78	.49	74LS298	.89
74LS83	.60	74LS299	1.75
74LS85	.69	74LS323	3.50
74LS86	.39	74LS324	1.75
74LS90	.55	74LS352	1.29
74LS91	.89	74LS353	1.29
74LS92	.55	74LS363	1.35
74LS93	.55	74LS364	1.95
74LS95	.75	74LS365	.49
74LS96	.89	74LS366	.49
74LS107	.39	74LS367	.45
74LS109	.39	74LS368	.45
74LS112	.39	74LS373	1.39
74LS113	.39	74LS374	1.39
74LS114	.39	74LS375	.95
74LS122	.45	74LS377	1.39
74LS123	.79	74LS378	1.18
74LS124	2.90	74LS379	1.35
74LS125	.49	74LS385	3.90
74LS126	.49	74LS386	.45
74LS132	.59	74LS390	1.19
74LS133	.59	74LS393	1.19
74LS136	.39	74LS395	1.19
74LS137	.99	74LS399	1.49
74LS138	.55	74LS424	2.95
74LS139	.55	74LS447	.95
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74LS147	2.49	74LS624	3.99
74LS148	1.35	74LS640	2.20
74LS151	.55	74LS645	2.20
74LS153	.55	74LS668	1.69
74LS154	1.90	74LS669	1.89
74LS155	.69	74LS670	1.49
74LS156	.69	74LS674	14.95
74LS157	.65	74LS682	3.20
74LS158	.59	74LS683	3.20
74LS160	.69	74LS684	3.20
74LS161	.65	74LS685	3.20
74LS162	.69	74LS688	2.40
74LS163	.65	74LS689	3.20
74LS164	.69	81LS95	1.49
74LS165	.95	81LS96	1.49
74LS166	1.95	81LS97	1.49
74LS168	1.75	81LS98	1.49
74LS169	1.75	25LS2521	2.80
74LS170	1.49	25LS2569	4.25

74S00

74S00	.32	74S124	2.75	74S197	1.49
74S02	.35	74S132	1.24	74S201	6.95
74S03	.35	74S133	.45	74S225	7.95
74S04	.35	74S134	.50	74S240	2.20
74S05	.35	74S135	.89	74S241	2.20
74S08	.35	74S138	.85	74S244	2.20
74S09	.40	74S139	.85	74S251	.95
74S10	.35	74S140	.55	74S253	.95
74S11	.35	74S151	.95	74S257	.95
74S15	.35	74S153	.95	74S258	.95
74S20	.35	74S157	.95	74S260	.79
74S22	.35	74S158	.95	74S273	2.45
74S30	.35	74S161	1.95	74S280	1.95
74S32	.40	74S162	1.95	74S287	1.90
74S37	.88	74S163	1.95	74S288	1.90
74S38	.85	74S168	3.95	74S289	6.89
74S40	.35	74S169	3.95	74S301	6.95
74S51	.35	74S174	.95	74S373	2.45
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74S65	.40	74S181	3.95	74S387	1.95
74S74	.50	74S182	2.95	74S412	2.98
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74S86	.50	74S189	6.95	74S472	4.95
74S112	.50	74S194	1.49	74S474	4.95
74S113	.50	74S195	1.49	74S570	2.95
74S114	.55	74S196	1.49	74S571	2.95

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8T28	1.89
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8T96	.89
8T97	.89
8T98	.89
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DP8304	2.29
DS8833	2.25
DS8835	1.99
DS8836	.99
DS8837	1.65
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9368	3.95
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78M05C	.35	7908T	.85
7808T	.75	7912T	.85
7812T	.75	7915T	.85
7815T	.75	7924T	.85
7824T	.75		
7805K	1.39	7905K	1.49
7812K	1.39	7912K	1.49
7815K	1.39	7915K	1.49
7824K	1.39	7924K	1.49
78L05	.69	79L05	.79
78L12	.69	79L12	.79
78L15	.69	79L15	.79
78H05K	9.95	LM323K	4.95
78H12K	9.95	UA78540	1.95

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76488	5.95	AY3-8912	12.95
76489	8.95	MC3340	1.49
SSI-263			39.95

EPROM ERASERS
SPECTRONICS CORPORATION

	Timer	Capacity Chip	Intensity (uW/Cm ²)	
PE-14		9	8,000	83.00
PE-14T	X	9	8,000	119.00
PE-24T	X	12	9,600	175.00
PL-265T	X	30	9,600	255.00
PR-125T	X	25	17,000	349.00
PR-320T	X	42	17,000	595.00

DATA ACQUISITION.

ADC0800	15.55	DAC0800	4.95
ADC0804	3.49	DAC0808	2.95
DAC0806	1.95	DAC1020	8.25
ADC0809	4.49	DAC1022	5.95
ADC0816	14.95	MC1408L6	1.95
ADC0817	9.95	MC1408L8	2.95

LINEAR

LM301	.34	LM348	.99	LM567	.89	LM1812	8.25
LM301H	.79	LM350K	4.95	NE570	3.95	LM1830	3.50
LM307	.45	LM350T	4.60	NE571	2.95	LM1871	5.49
LM308	.69	LM358	.69	NE590	2.50	LM1872	5.49
LM308H	1.15	LM359	1.79	NE592	2.75	LM1877	3.25
LM309H	1.95	LM376	3.75	LM709	.59	LM1889	1.95
LM309K	1.25	LM377	1.95	LM710	.75	LM1896	1.75
LM310	1.75	LM378	2.50	LM711	.79	ULN2003	2.49
LM311	.64	LM379	4.50	LM723	.49	LM2877	2.05
LM311H	.89	LM380	.89	LM723H	.55	LM2878	2.25
LM312H	1.75	LM380N-8	1.10	LM733	.98	LM2900	.85
LM317K	3.95	LM381	1.60	LM741	.35	LM2901	1.00
LM317T	1.19	LM382	1.60	LM741N-14	.35	LM2917	2.95
LM318	1.49	LM383	1.95	LM741H	.40	LM3900	.59
LM318H	1.59	LM384	1.95	LM747	.69	LM3905	1.25
LM319H	1.90	LM386	.89	LM748	.59	LM3909	.98
LM319	1.25	LM387	1.40	LM1014	1.19	LM3911	2.25
LM320 (see 7900)		LM389	1.35	LM1303	1.95	LM3914	3.95
LM322	1.65	LM390	1.95	LM1310	1.49	LM3915	3.95
LM323K	4.95	LM392	.69	MC1330	1.69	LM3916	3.95
LM324	.59	LM393	1.29	MC1349	1.89	MC4024	3.95
LM329	.65	LM394H	4.60	MC1350	1.19	MC4044	4.50
LM331	3.95	LM399H	5.00	MC1358	1.69	RC4136	1.25
LM334	1.19	NE531	2.95	MC1372	6.95	RC4151	3.95
LM335	1.40	NE555	.34	LM1414	1.59	LM4250	1.75
LM336	1.75	NE556	.65	LM1458	.59	LM4500	3.25
LM337K	3.95	NE558	1.50	LM1488	.69	RC4558	.69
LM337T	1.95	NE561	24.95	LM1489	.69	LM13080	1.29
LM338K	6.95	NE564	2.95	LM1496	.85	LM13600	1.49
LM339	.99	LM565	.99	LM1558H	3.10	LM13700	1.49
LM340 (see 7800)		LM566	1.49	LM1800	2.37	MPQ2907	1.95

H TO-5 CAN

T TO-220

K TO-3

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CA 3023	2.75	CA 3082	1.65
CA 3039	1.29	CA 3083	1.55
CA 3046	1.25	CA 3086	.80
CA 3059	2.90	CA 3089	2.99
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CA 3065	1.75	CA 3130	1.30
CA 3080	1.10	CA 3140	1.15
CA 3081	1.65	CA 3146	1.85
CA 3160	1.19		

TI

TL494	4.20	75365	1.95
TL496	1.65	75450	.59
TL497	3.25	75451	.39
75107	1.49	75452	.39
75110	1.95	75453	.39
75150	1.95	75454	.39
75154	1.95	75491	.79
75188	1.25	75492	.79
75189	1.25	75493	.89
75494	.89		

BI FET

TL071	.79	TL084	2.19
TL072	1.19	LF347	2.19
TL074	2.19	LF351	.60
TL081	.79	LF353	1.00
TL082	1.19	LF355	1.10
TL083	1.19	LF356	1.10
LF357	1.40		

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- WEIGHT: 1.26 LBS.
- * +5V @ 6A +12V @ 1A
- 12 @ 1A +24V @ 1.5A

\$44⁹⁵

KEPCO/TDK MODEL MRM174NF
* QUAD OUTPUT SWITCHING POWER SUPPLY
* 6.2" x 7.4" x 1.7"

- WEIGHT: 1.6 LBS.
- * +5V @ 5A +12V @ 2.5A
- +12 @ 2A -12V @ .5A

\$59⁹⁵

* BOTH +12V OUTPUTS CAN BE USED AS +24V
ASTEC AA11190

- * QUAD OUTPUT SWITCHING DESIGN AS USED IN APPLE III
- * +5V @ 4A -5V @ .25A
- +12 @ 2.5A -12V @ .30A
- * 15.5" x 4.5" x 2"
- WEIGHT: .884 LBS.

REG. \$59⁹⁵

NOW \$39⁹⁵

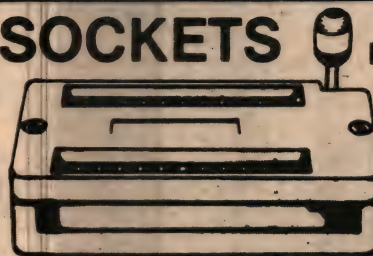
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- PLEASE INCLUDE SHIPPING AND HANDLING CHARGES
- SPECIALS END 9-30-84

REG. \$19⁹⁵

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ZIF =
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Insertion
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4N28	.69	IL-1	1.25
4N33	1.75	ILA-30	1.25
4N35	1.25	ILQ-74	2.75
4N37	1.25	H11C5	1.25
MCT-2	1.00	TIL-111	1.00
MCT-6	1.50	TIL-113	1.75

CAPACITORS TANTALUM

	6V	10V	15V	20V	25V	35V
.22uf						.40
.27						.40
.33						.40
.47				.35		.50
.68						.45
1.0		.40	.40	.45	.45	
1.5			.45		.50	
1.8					.75	
2.2		.35	.40	.45	.65	
2.7		.40	.45		.80	
3.3		.45	.50	.55	.80	.85
3.9			.45			
4.7	.45	.55		.60	.85	.85
6.8			.70		.75	
10	.55	.85	.80	.85	.90	1.00
12	.65		.85	.90		
15	.75	.85	.90			
18			1.25			
22		1.00	1.35			
27			2.25			
39		1.50				
47	1.35					
56	1.75					
100		3.25				
270	3.75					

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1N759	12.0 volt zener	.25
1N4148	(1N914) switching	25/1.00
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KBP02	200PIV 1.5amp bridge	.45
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VM48	Dip-Bridge	.35

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SPST mini-pushbutton	.39

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MPS918	.25	2N3772	1.85
2N2102	.75	2N3903	.25
2N2218	.50	2N3904	.10
2N2218A	.50	2N3906	.10
2N2219	.50	2N4122	.25
2N2219A	.50	2N4123	.25
2N2222	.25	2N4249	.25
PN2222	.10	2N4304	.75
MPS2369	.25	2N4401	.25
2N2484	.25	2N4402	.25
2N2905	.50	2N4403	.25
2N2907	.25	2N4857	1.00
PN2907	.125	PN4918	.25
2N3055	.79	2N5086	.25
3055T	.69	PN5129	.25
2N3393	.30	PN5139	.25
2N3414	.25	2N5209	.25
2N3583	.40	2N6028	.35
2N3585	.40	2N6043	1.75
PN3585	.25	2N6045	1.75
MPS3638	.25	MPS-A05	.25
MPS3640	.25	MPS-A08	.25
PN3643	.25	MPS-A55	.25
PN3644	.25	TIP29	.65
MPS3704	.15	TIP31	.75
		TIP32	.79

IC SOCKETS

	1.00 100
8 pin ST	.13 .11
14 pin ST	.15 .12
18 pin ST	.17 .13
18 pin ST	.20 .18
20 pin ST	.29 .27
22 pin ST	.30 .27
24 pin ST	.30 .27
28 pin ST	.40 .32
40 pin ST	.49 .39
64 pin ST	4.25 call

ST = SOLDERTAIL

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HARDWARE	.10	.09

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MAN 74	.3"	CC	.99
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FND-507 (510)	.5"	CA	1.49
TIL-311 4x7	.270"	HEX W/LOGIC	9.95

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4 POSITION	.85
5 POSITION	.90
6 POSITION	.90
7 POSITION	.95
8 POSITION	.95

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10pf	50V .05	470	50V .05
22	50V .05	560	50V .05
25	50V .05	680	50V .05
27	50V .05	820	50V .05
33	50V .05	.001uf	50V .05
47	50V .05	.0015	50V .05
56	50V .05	.0022	50V .05
68	50V .05	.005	50V .05
82	50V .05	.01	50V .07
100	50V .05	.02	50V .07
220	50V .05	.05	50V .07
330	50V .05	.1	12V .10
		.1	50V .12

MONOLITHIC

.1uf-mono	50V .18	.47uf-mono	50V .25
.047uf-mono	50V .15	.01uf-mono	50V .14

ELECTROLYTIC

	RADIAL		AXIAL
.47uf	50V .14	1uf	50V .14
1	25V .14	4.7	16V .14
2.2	35V .15	10	16V .14
4.7	50V .15	10	50V .16
10	50V .15	22	16V .14
47	35V .18	47	50V .20
100	16V .18	100	15V .20
220	35V .20	100	35V .25
470	25V .30	150	25V .25
2200	16V .80	220	25V .30
		330	16V .40
		500	16V .42
		1000	16V .60
		1500	16V .70
44,000uf	30V 3.95	6000	16V .85

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- ★ Dimensions 8" x 5 1/8" x 3 1/8"
- ★ Color matches Apple
- ★ Fits standard 5 1/4" drives, inc. Shugart
- ★ Includes mounting hardware and feet

CABINET #2 \$79.00

- ★ Complete with power supply, switch, line cord, fuse & standard power connector
 - ★ Dimensions: 11 1/2" x 5" x 3 1/8"
 - ★ +5V @ 1 AMP, +12V @ 1.5 AMP
 - ★ Please specify gray or tan
- NOTE: Please include sufficient amount for shipping on above items.

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MPI

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TEAC

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8" DISK DRIVE

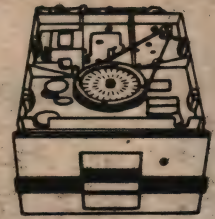
FD 100-8 BY SIEMENS, SHUGART 801 EQUIV.	
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SS/DD — 10/\$149 EA.	\$169.00
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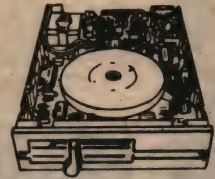
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COMPONENT CARRIERS (DIP HEADERS)	ICCxx	.65	.75	.85	1.00	1.25	1.25	1.35	1.50 2.10
RIBBON CABLE DIP PLUGS (IDC)	IDPxx	---	1.45	1.65	---	---	---	2.50	---

For order instructions see "IDC Connectors" below.

D-SUBMINIATURE

DESCRIPTION	ORDER BY	CONTACTS				
		9	15	25	37	50
SOLDER CUP	MALE DPxxP	2.08	2.69	2.50	4.80	6.06
	FEMALE DBxxS	2.66	3.63	3.25	7.11	9.24
RT. ANGLE	MALE DBxxPR	1.65	2.20	3.00	4.83	---
PC HOLDER	FEMALE DBxxSR	2.18	3.03	4.42	6.19	---
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	FEMALE IDBxxS	3.69	5.13	6.84	10.08	---
HOODS	BLACK HOOD-B	---	---	1.25	---	---
	GREY HOOD	1.60	1.60	1.25	2.95	3.50

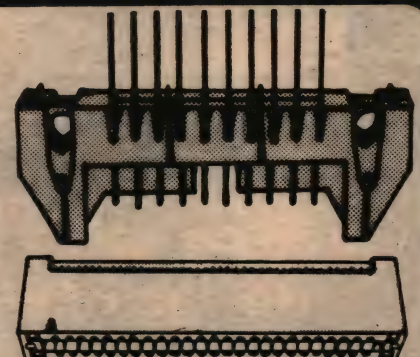
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**IDC CONNECTORS**

DESCRIPTION	ORDER BY	CONTACTS					
		10	20	26	34	40	50
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RT. ANGLE SOLDER HEADER	IDHxxSR	.85	1.35	1.76	2.31	2.72	3.39
WW HEADER	IDHxxW	1.86	2.98	3.84	4.50	5.28	6.63
RT. ANGLE WW HEADER	IDHxxWR	2.05	3.28	4.22	4.45	4.80	7.30
RIBBON HEADER SOCKET	IDSxx	1.15	1.86	2.43	3.15	3.73	4.65
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TM 100-2

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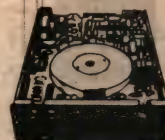


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- ★ INCLUDES INSTRUCTIONS

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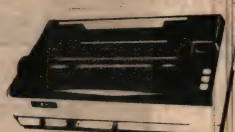
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ATARI

Atari, The House That Jack Bought

By Stan Veit

On July 2, 1984, Warner Communications Inc. announced that their Atari Computer subsidiary had been sold to a company headed by Jack Tramiel, formerly CED of Commodore.

While it had been general knowledge that the home computer and home video game segments of the business were on the block after Warner's losses were reported to be \$425 million for the second quarter of 1984, the sale came as a surprise to the industry.

Jack Tramiel is known for surprises. His management of Commodore and the introduction of the Pet, VIC-20 and Commodore 64 Computers all defied conventional industry "wisdom" and all were a huge success. In fact, it might be said that Commodore under the leadership of Jack Tramiel is the only company that has made a success out of home computers. In addition, his opening of the educational

market with the "buy 2, get one free" sales was a master stroke of marketing. He was also a leader in the educational software field, providing free programs to schools.

Jack has been known as a hard man to work for and there were many jokes about "The President of The Month Club" at Commodore. However none can deny his ability or drive. It came as a shock when he resigned from the leadership of Commodore, this was one surprise that nobody expected. He merely said the company had grown beyond the point where his type of leadership was needed by the organization and that it was better if he left.

Now he is confronted by a company that has been badly abused by a non-understanding management and that has managed to snatch defeat from the jaws of victory. It will take all of the efforts of even Jack Tramiel to turn this one around. When

asked about the prospects, Jack said, "both the computer and video game marketplace continue, in my view, to offer great opportunities. The enormous potential of applying technological developments in the fields of communication, entertainment and education is the challenge for us all over the years ahead. At Atari, I believe there is the capability and the foundation which will enable us to fulfill this transaction, and eager to proceed with the work ahead."

The financial arrangements for the sale include an infusion of \$75 million by Jack Tramiel and his associates. Warner Communications received \$240 million in debts of the new company. This means that the company was sold for a future payoff, (if possible). A good deal for both parties since the computer business represented a drag on Warner.

In an attempt to get some

additional information for our readers, we contacted Atari, but their spokesman would only say, "We have nothing to say to the press at this time". This is the same kind of thing that Atari has been noted for in the past, failure to communicate with its users and the industry

press. It represents a kind of isolation from the market that in some measure contributed to its failure to capitalize on what was essentially a good product line. This is not Jack Tramiel's style and you may be sure that things will be different in the near future.

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Los Angeles Byte Show

by Hardin Brothers

Once upon a time there were only a few computer shows a year, each with its own personality and each in a different major city.

Now there seem to be several shows each weekend. One organization alone, The Interface Group, has scheduled thirty-five shows this year, and plans additional cities and weekends next year.

The Los Angeles Byte Computer Show (June 14 to 17) was one of their recent stops. After a disappointing Byte Show earlier in Chicago, this show had to prove that the concept was valid. They came close to succeeding.

On Thursday, the first day of the show, things looked bleak. I heard exhibitors complaining about the lack of visitors, and visitors complain-

ing about the lack of exhibitors. By the weekend, however, everyone seemed to be in a much better mood, and the show seemed to be at least a moderate success.

When I heard that the show was to take place in the Los Angeles Convention Center, a mammoth building, I assumed that it would be a large affair with several hundred exhibitors. I arrived on Thursday

morning to find that a nephrology conference was being held in the Convention Center, and that the Byte show was relegated to a much smaller building to the east called North Hall (you figure it out!). Once I was inside, I was further dismayed to see that the computer show only used about two thirds of the space available in North Hall. I think the same disappointment hit

most people that morning as they walked in.

There were just under 100 exhibitor booths allocated for the show. A five minute walk around the exhibit floor revealed that not all the booths had been rented. Though there were banners overhead numbering the aisles from 100 to 600, they were totally unnecessary; it was impossible to get lost among the displays.

None of the big computer manufacturers were present at the show. IBM, Apple, Tandy, Commodore, Atari, TI, etc., were all conspicuous by their absence. Kaypro did have an exhibit, however, as well as Tava (an IBM clone), Seequa (another clone), Blue Fox, (yet another clone), and Fujitsu (an upward-expandable clone).

In some ways, the most interesting of the clone exhibitors was Blue Fox. It's likely that you've never heard of the name; the computer had been on the market for three weeks prior to this show -- more precisely, from what I could determine, it had been displayed at another show three weeks earlier. The Blue Fox was offered in two ver-

Continued on page 107

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Byte Show Continued from page 106

sions: a \$1700 entry model with 64K RAM and a single floppy disk drive and an advanced model with a 10-megabyte hard disk and 192K RAM for \$3200.

However, the person I talked to in the Blue Fox booth said that they would soon discontinue the advanced, hard disk model to concentrate on the cheaper model. I know that things are supposed to move quickly in this industry, but this is the first time I've heard of a manufacturer dropping a computer before it has been on the market a month.

The majority of the exhibitors were selling computing supplies and software distributors. There was the usual assortment of disk drives, inexpensive diskettes, disk library cases, cables, printers and ribbons, educational and game programs, and the like. The DAK Industries booth was demonstrating a \$199 Olivetti ink jet printer. Save your money -- unless you want to trade the noise of your present dot matrix or daisy wheel printer for shrill squeaks and blurry print. The concept of the ink jet printer is superb, but the implementation, at least of this model, leaves much to be desired.

Of course, only half of any "modern" computer show is held on the exhibit floor. The other -- and often the most interesting -- half is the series of conferences that are held in adjacent meeting or lecture rooms. A large majority of the conference titles for this show were intriguing. Unfortunately, because of the way the conferences were scheduled, it was impossible to attend more than three of the nine scheduled sessions each day.

The titles for the conferences were chosen by the Interface Group, the show's promoter. Often, the conference titles and content had little correlation. For example, an hour and a half session entitled "Who Needs 32 bits?" was really a 45 minute explanation of the Z80000 chip by a representative from Zilog and a 45

minute talk about the 16000 family of CPUs by a representative from National Semiconductor.

I don't mean to imply that either talk was boring. In fact, I found that session to be one of the most interesting that I attended. However, no one seemed to have any intention of addressing the stated topic of the session. The same held true throughout much of the show: intriguing topic titles were invented for sessions that were really explanations of new hardware or software products. The speakers at the sessions (who were not responsible for the session titles) rarely were involved in any discussion between themselves.

The two most interesting speakers were Peter Norton, who delivered the keynote address, and Byte columnist Jerry Pournelle, whose session was added at the last minute on Saturday and who drew by far the largest crowd. Both made

provocative, and at times outrageous, statements. I doubt that anyone in the audience agreed with everything that either one said, but they both challenged the audience to think about the microcomputer industry and its rapid (and sometimes incomprehensible) changes.

One undercurrent that seemed to run throughout the

show was a general disenchantment with the Apple Macintosh. Pournelle called it "the world's most expensive Etch-a-Sketch" and others criticized it for its lack of memory, weak documentation, and reliance on icons that get in the way of an experienced user. The audience seemed to agree with those criticisms.

Also, a warning to those

considering the Apple IIc. One software distributor at the show said that it would be some time before he would have IIc versions of all the II+ / IIe products he carries. Apparently, the system call points in the ROMs have been changed, and the new IIc is not as compatible with its predecessors as many people had thought.

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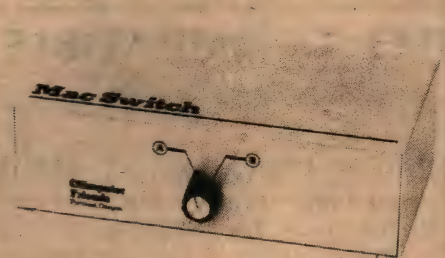
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Atari Software Reviews

By Jeff Brenner

This month you'll notice the addition of the traditional four star rating system in my

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★★★★ EXCELLENT
★★★ GOOD
★★ FAIR
★ POOR

The program is rated on

each of the following criteria:

(1) **PROGRAM DESIGN** - This refers to the overall quality of the program. How are the graphics? The sound effects? Is

is easy to use? etc.

(2) **AMUSEMENT LEVEL** (for game programs) or **PRACTICALITY** (for non-game programs) - How entertaining is the game? How useful is the program?

(3) **DOCUMENTATION** - Are the instructions ample for the particular program? Are they easy to understand?

(4) **VALUE** - A game program might be appealing, but if it sells for a hundred dollars, you might not want it. This gives an indication of how much you get for your money.

The overall rating is based on the average of all of these ratings and appears with the name of the program. If you think I should include other criteria or have any other comments/ suggestions, send me a note c/o Computer Shopper. Manufacturers: If your programs will stand up to my criteria, send them in to me. We want to see more exciting, entertaining, top-notch programs.

Now, on to the reviews!

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Continued on page 110

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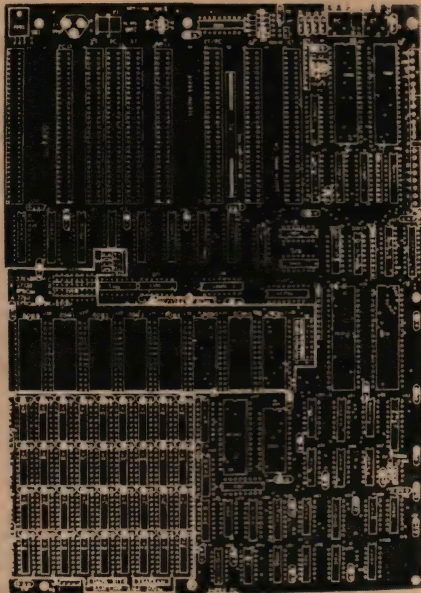
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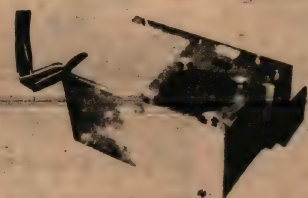
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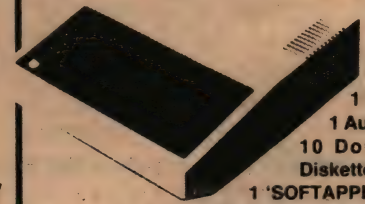
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Atari Reviews

Continued from page 108

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The year is none other than 2096 and the world is in serious trouble. Computer Control, a huge computer, has suddenly decided to remove all freedoms

from the face of the earth. It is located far from civilization and is extremely well protected by intelligent flak batteries. These flak batteries relentlessly seek out offensive crafts and destroy them.

You are provided with a state of the art aircraft and an

air-to-ground cannon. Your assignment: Save the earth by blowing up the oversized CPU.

Welcome to Flak, FunSoft's newest action game. But not so fast... Although Flak is on diskette, it takes almost a minute and a half to load. Its loading brings back memories of those cassette days of waiting patiently for minutes with annoying beeps and I/O errors until the program would load. The long loading time is due to extensive copy protection which FunSoft calls "Synchrolock." It's just another hardship we must endure because of the activities of software pirates. Let's hope the long loading period will not

become characteristic of all new releases for the Atari, or else we might as well sell our drives and bring out the program recorder.

Once the game is loaded, though, things move swiftly. You can choose the NORMAL or BEGINNER play level, and one or two players. On the beginner level, the flak batteries fire less frequently than the NORMAL level. I noted one problem with the two player game. The program reads only the first joystick port. Thus, even if you have two joysticks, you and your opponent must take turns using the first joystick - an inconvenience.

You are given four aircrafts when the game begins. An extra craft is given for every 10,000 points scored. The craft takes off from the airstrip, and then takes you over the trees and roads down below. But amidst the beautiful scenery are the flak batteries. You must shoot the batteries to score points, while avoiding their fire. The high resolution scrolling graphics are excellent and impressive. Holding down the joystick trigger will result in continuous fire. I like that.

The screen slowly becomes more ominous and dangerous as you approach Computer Control. The flak batteries become more numerous, and in one section, they are even invisible until they fire at you.

When you are hit by the flak, you lose a ship and you take off from the airstrip again. However, you do not have to start all over from the beginning, as many games make you do. Instead, the aircraft rapidly zooms through all of the scenery until it reaches the point where you were hit. That's exciting and builds up tension.

If you survive long enough to reach the CPU, you'll notice that the surroundings become somewhat ridiculous. One moment you are above realistic terrain and the next you are flying over gigantic computer ships. And what does Computer Control turn out to be?

Continued on page 112

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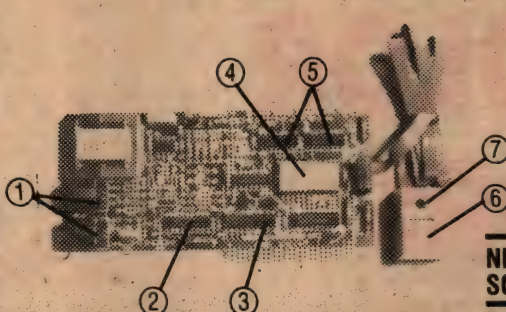
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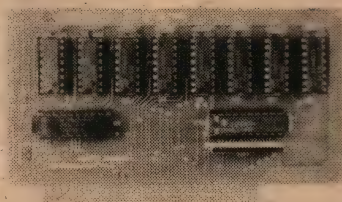
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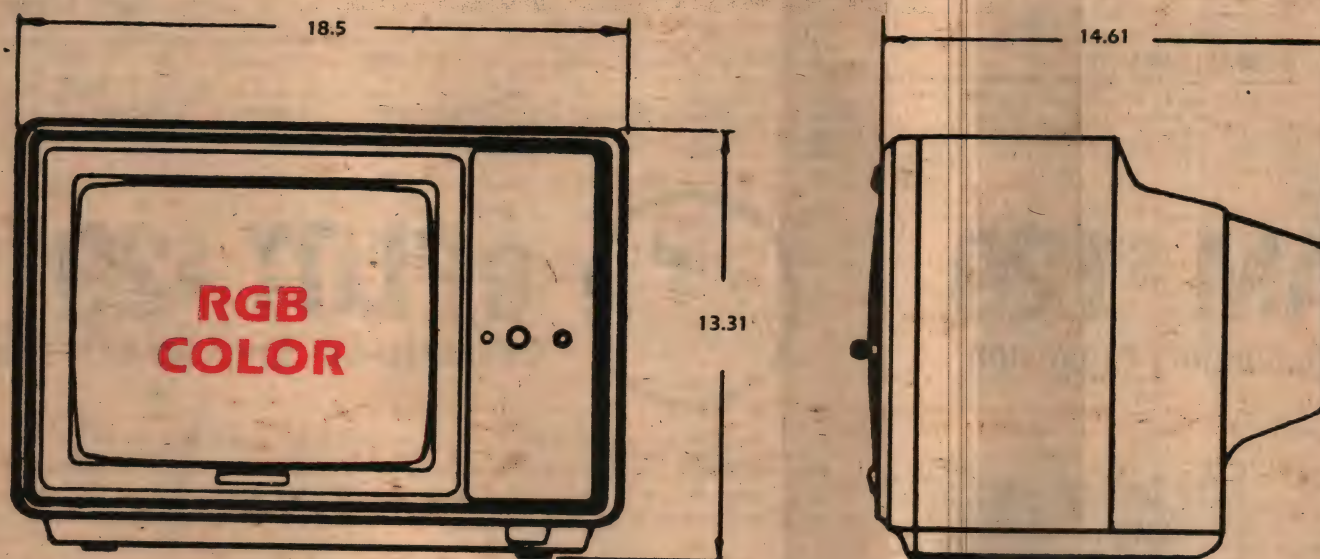
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Atari Reviews

Continued from page 110

A colossal 6502 chip! Destroying Computer Control earns you bonus points and a chance to do it all over again. The high scores are saved to disk.

The documentation for this game is flimsy. It consists of loading instructions and maybe 150 words on playing the game. You'll learn more on how to play from this review. However, as FunSoft probably assumed, most of you will be able to figure out how to play soon after the game begins.

While Flak might not be "the ultimate flight experience" as its packaging claims, and its price is somewhat high, it is appealing and addicting. The graphics are as good as they can be, and the music and sound effects are well done. I think you'll like it.

RATINGS FOR FLAK:

Program Design ★★★★★
Amusement Level ★★★★★

Continued on page 114

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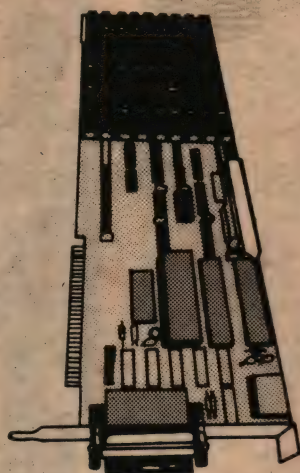
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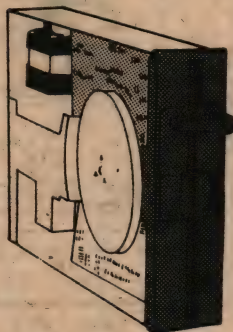
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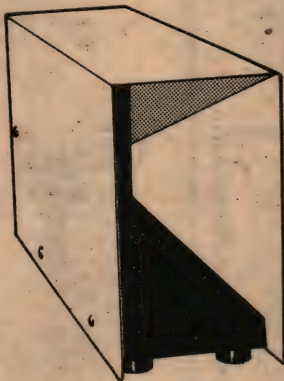
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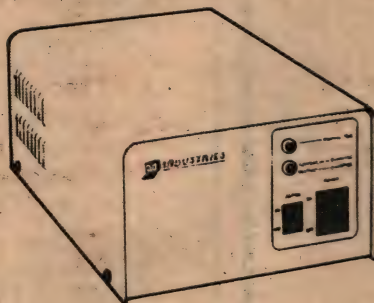
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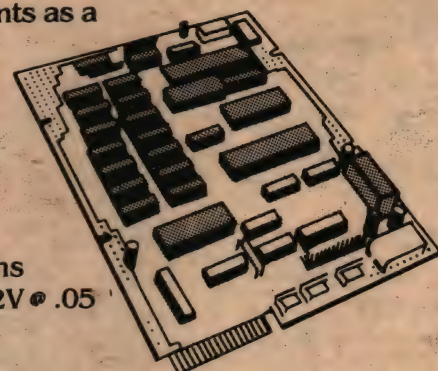
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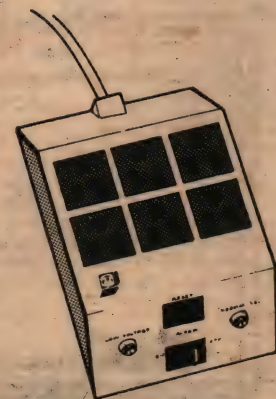
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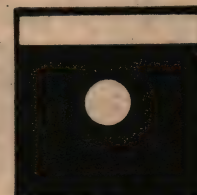
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Atari Reviews
Continued from page 112

Documentation ★★
Value ★★
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Also available for the Com-
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LINERS, etc.) than you. If you
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Continued on page 116

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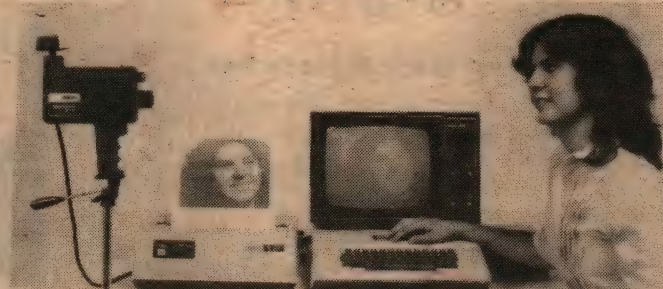
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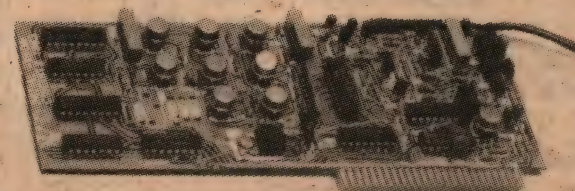
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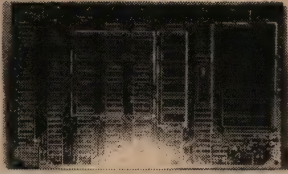
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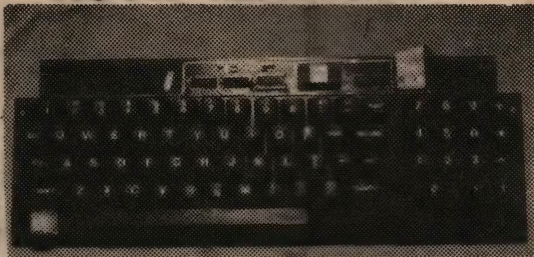
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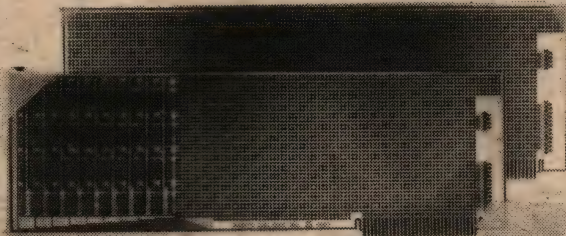
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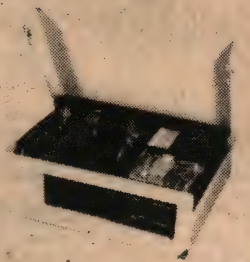


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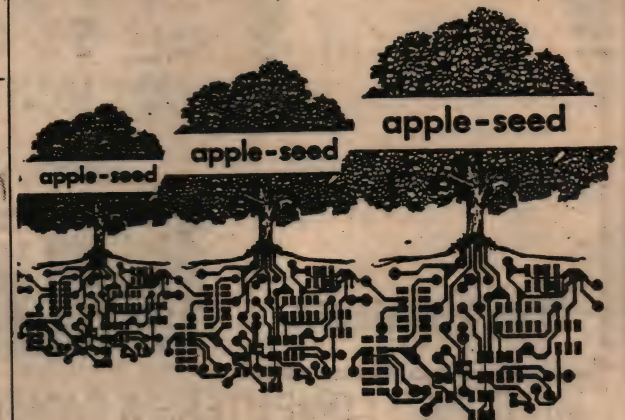
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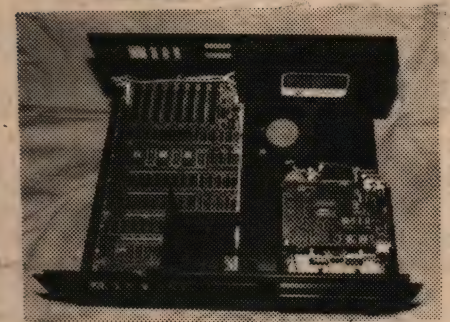
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Atari Reviews
Continued from page 114
 "HEAT" Muldoon pitches to you.
 After you've listened to the

National Anthem, you're out at the stadium. The graphics are fantastically realistic - you not only see the field and the players, but you see the

dugouts and the spectators in the stadium. But the realism doesn't end there: the batters can bunt, runners can steal bases, and the pitcher throws more slowly as he becomes tired.

The shadow of the ball is visible whenever the ball is in the air. The shadow is extremely important in the game as it helps you determine whether a pitch is too high or low, and whether a hit is a grounder or a fly. Also, a fly ball is caught by positioning the fielder on the shadow of the falling ball.

Batting is done by pressing the trigger. An early swing will hit the ball to the left field, while a late swing will hit it to right field. Homeruns are apparently random, and occur about three times per game.

You'll have to develop good timing and become familiar with the various pitches before you can become a proficient batter. If you hit a fair ball, you will be automatically advanced to first base. However, once on first base, you can move to lead or to steal. You can also move back to first base. When more than one runner is on base, you control the leading one, while the other: are moved automatically, if forced.

When the ball has been hit, the fielder closest to it becomes active and can be moved to catch the ball or to throw it to a base. Double, and even triple plays are possible as any baseman can throw the ball to another. The baseman holding the ball turns to a solid black color and can be moved to any points on the field.

The full nine innings are played, and the game goes into extra innings if necessary. As the game progresses, the pitchers become tired and their pitches slow down or miss the strike zone. However, you can choose a relief pitcher after the seventh inning. All of this adds to the realism of the game. The scoreboard is displayed after every half inning.

The animation of the players is well done, and the sound effects add to the excitement. The music at the beginning and between half-innings should also be commended. The documentation is com-

plete and easy to understand. I do have two minor criticisms of Star League Baseball. As realistic as the game is, there are a few occurrences which are rarely seen in American baseball. For example, a batter can hit a ball into the outfield and be thrown out at first. Another criticism concerns the advertisements which Gamestar displays between innings for their products. After the first few times, this becomes annoying. Yet, these

complaints are insignificant when compared to the quality of this game.

Just about every aspect of real baseball has been captured in this program. I highly recommend this "hit." Great work, Gamestar.

RATINGS FOR STAR LEAGUE BASEBALL	
Program Design	★★★★
Amusement Level	★★★★
Documentation	★★★★
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

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How To Directly Access RS-232 Ports On TI-99/4A

By Randy Holcomb

Many people have asked me to explain in better detail how they can directly access the RS232 ports on their 99/4As for such things as terminal emulators, BBS Software, protocol file transfer software, and so on. Many of these people have made some attempt at

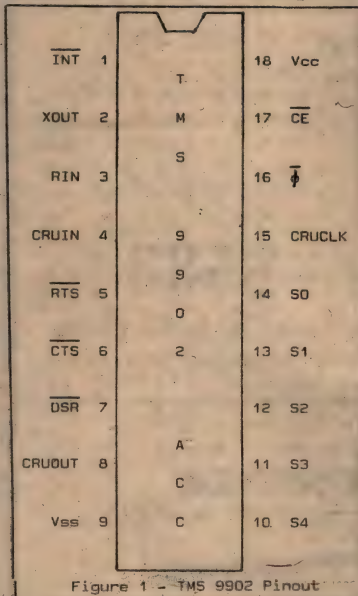


Figure 1 - TMS 9902 Pinout

trying to do single byte I/O using the standard DSR entries but soon get frustrated with the hassle that is involved, not to mention the lack of ability to tell when a character has arrived at the port, detecting carrier and ringing signals and other such useful features. In this article we will give you an overview of the TMS 9902 Asynchronous Communications Controller Chip used in the TI RS232 Card and define the input CRU testing bits; the final article will explain the details of programming the 9902 directly with some code examples.

TMS 9902 Overview. Figure 1 shows the pinout of the TMS 9902 ACC Chip. The 9902 is fabricated using NMOS and uses standard TTL level signals on all inputs and outputs. The device is capable of handling asynchronous communications with word lengths from 5 to 8 bits with 1, 1½ and 2 stop bits, full parity checking (even/odd/none) with built in data rate generation (no external bit rate generators required) up to 19,200 bits per second. The 9902 also includes an interval timer with resolution from 64 to 16,320 microseconds. Interfacing between the 9902 and the 9900 host environment is done thru the Communications Register Unit, the CRU. As you look at Figure 1 you see S0-S4, these are the CRU address lines that are used to interface the 9902 to any 9900 series microprocessor. When the chip enable (pin 17) is asserted the 9902 is placed on the bus and the function requested is determined by S0-S4 and the CRU control logic. CRUCLK (pin 15) provides the CRU timing while the system clock (pin 16) provides the timing for the rest of the 9902. CRUIN (pin 4) and CRUOUT (pin 8) are the CRU input and output bits, respectively. In addition to the CRU logic additional lines are provided for Request To Send (pin 5), Clear To Send (pin 6) and Data Set Ready (pin 7). The received data is on pin 3, the transmitted data is sent out over on pin 2, and the interrupt line for the 9902 is on pin 1. Finally, +5 volts goes on pin 18 and logic zero (ground) is on pin 9. For RS232 applica-

tions the widely used 75188/75189 buffer chips are used for bringing out the transmit/receive signals, as well as DSR, RTS and CTS. In the 99/4A RTS and CTS are tied together.

The interrupt pin will go to a low logic level when certain conditions occur during the operation of the 9902, these will be explained shortly.

TMS 9902 CRU Input Assignments. Accessing the 9902 in your program requires the use of assembly language with the CRU instructions TB, SBO, SBZ, LDCR and STCR;

check your Assembly Language reference manual for the format of the instructions. Table 1 shows the input bit assignments which goes as follows:

Bit 31: Interrupt. When programmed, any of the following conditions, if met; will set this bit and also cause the interrupt pin on the 9902 to be asserted: DSCINT, TIMINT, XBINT, RBINT. In addition, the respective bit that raised this condition will also be set.

Bit 30: Flag. Set when any of the load register commands are issued or when the break

bit is set.

Bit 29: Data Set Status Change. Set when DSR or CTS changes logic states and is stable for 2 clock cycles. This bit is cleared when an output to bit 21 (DSCENB) is made.

Bit 28: Clear To Send. Indicates the logic level on the Clear To Send pin. Note that the bit present will be the in-

Continued on page 120

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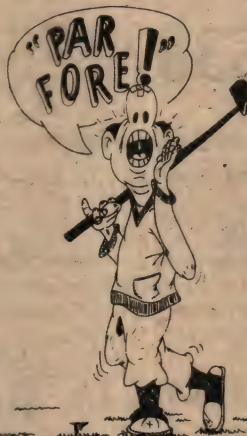
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Address	Base	Name	Description
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1 1 1 1 1	31	INT	Interrupt
1 1 1 1 0	30	FLAG	Register Load Control Flag
1 1 1 0 1	29	DSCB	Data Set Status Change
1 1 1 0 0	28	CTS	Clear To Send
1 1 0 1 1	27	DSR	Data Set Ready
1 1 0 1 0	26	RTS	Request To Send
1 1 0 0 1	25	TIMELP	Timer Elapsed
1 1 0 0 0	24	TIMERR	Timer Error
1 0 1 1 1	23	XSRE	Xmtr Shift Register Empty
1 0 1 1 0	22	XBRE	Xmtr Buffer Register Empty
1 0 1 0 1	21	RBRL	Recv Buffer Register Loaded
1 0 1 0 0	20	DSCINT	Data Set Change Interrupt
1 0 0 1 1	19	TIMINT	Timer Interrupt
1 0 0 1 0	18	-	Not used
1 0 0 0 1	17	XBINT	Transmitter Interrupt
1 0 0 0 0	16	RBINT	Receiver Interrupt
0 1 1 1 1	15	RIN	Receive Input
0 1 1 1 0	14	RSBD	Receive Start Bit Detect
0 1 1 0 1	13	RFBD	Receive Full Bit Detect
0 1 1 0 0	12	RFER	Receive Framing Error
0 1 0 1 1	11	ROVER	Receive Overrun Error
0 1 0 1 0	10	RPERR	Receive Parity Error
0 1 0 0 1	9	RCVERR	Receive Error
0 1 0 0 0	8	-	Not used
0-7	RBR7-0	-	Receive Buffer register/data

Table 1 - TMS 9902 Input CRU Bit Assignments

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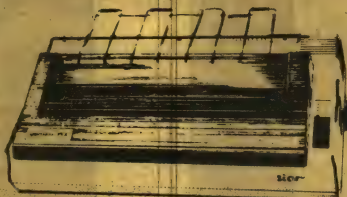
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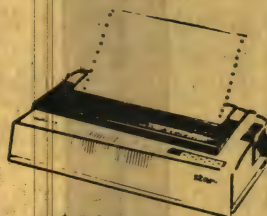
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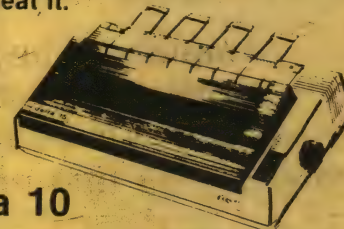
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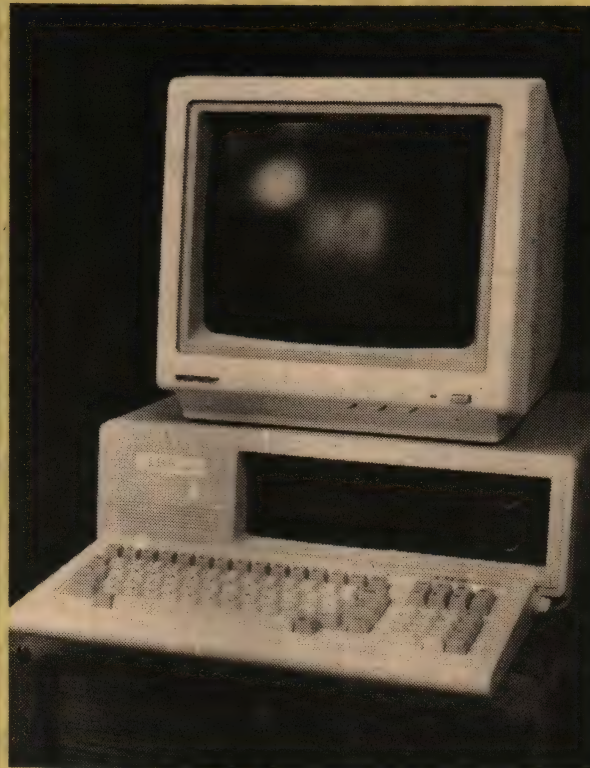
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TMS

Continued from page 117
verse of the logic level on the pin.

Bit 27: Data Set Ready. Indicates the logic level on the Data Set Ready pin. The bit will be inverse of the input.

Bit 26: Request To Send. Indicates the logic level of the Request To Send pin. The bit will be the inverse of the pin.

Bit 25: Timer Elapsed. Set when the timer register equals zero. Cleared by an output to bit 20 (TIMENB).

Bit 24: Timer Error. This bit is set when the timer has reached zero and when TIMELP is set. This is raised when the

software fails to recognize TIMELP and reset it before another interval passed. This is also cleared by an output to bit 20.

Bit 23: Transmitter Shift Register Empty. Set when the Transmitter shift register is not sending data (also indicates that XOUT is at a high logic level.) When this bit is at logic zero, character transmission is in progress.

Bit 22: Transmit Buffer Register Empty. When set, this indicates that there is not a character waiting to be transmitted. It is set to a logic

Continued on page 124

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 APPLE JAX USERS GROUP, 7670 KNOLL DR. NORTH, JACKSONVILLE, FL 32221
 ATARI COMPUTER CLUB OF SOUTH BREVARD, (AN INDEPENDENT USERS GROUP), c/o LOREN FULLER, 530 SYLVIA RD., W. MELBOURNE, FL 32901
 ATARI COMPUTER CLUB OF THE PALM BEACHES, c/o MARVIN COX, 4106 FERN ST., LAKE WORTH, FL 33461
 ATARI COMPUTER USERS GROUP OF TEMPORE PINES, FL 1691 NW 97TH WAY, TEMPORE, FL 33024 c/o NEAL OCHACHER
 ATLANTIS COMPUTER CLUB OF ATLANTIS PRIVATE SCHOOLS, 5432 HALLANDALE BEACH BLVD., HOLLYWOOD, FL 33023
 BRANDON USERS GROUP, 108 ANGLEWOOD DRIVE, BRANDON, FL 33511
 B.U.G. BREVARD USERS GROUP, PO BOX 1402, PALM BAY, FL 32906
 CENTRAL FLORIDA COMPUTER SOCIETY, 2821 SUNSET DR., APOPKA, FL 32703, (305) 862-1329, (MONTHLY MEETINGS), ORLANDO UTILITIES BLDG., 500 S. ORANGE AVE., ORLANDO, FL
 CLEARWATER COMMODORE CLUB, 1532 LEMON ST., CLEARWATER, FL 33516
 COLOR COMPUTER CLUB OF SARASOTA, 4047 BEE RIDGE RD., SARASOTA, FL 33582 ATT: ERNIE BONTRAGER
 DAYTONA BEACH APPLE USERS GROUP, c/o BOB MCFARLAND, 30 ARROWHEAD CIRCLE, ORMOND BEACH, FL 32074
 EL-SHIFT-ON, PO BOX 548, COCOA, FL 32922
 ELSE, PO BOX 2142, PINELLAS PARK, FL 33565
 FLORIDA WEST COAST OSBORNE CLUB, 1210 CASEY KEY ROAD, NOKOMIS, FL 33555
 G.C.O.B., PO BOX 570609, MIAMI, FL 33157
 GREATER ORLANDO 99ERS, c/o EUGENE DIVEGLIA, PO BOX 1381, MAITLAND, FL 32751
 JACKSONVILLE COLOR COMPUTER CLUB, 2411 HIRSCH AVE., JACKSONVILLE, FL 32216
 JACKSONVILLE HEATH USERS GROUP, 8262 ARLINGTON EXPRESSWAY, JACKSONVILLE, FL 32211
 JACKSONVILLE OSBORNE USERS GROUP, 6011 BROOKRIDGE DR., JACKSONVILLE, FL 32210
 MANASOTA COMMODORE USERS GROUP, 916 E. 35TH AVE., DR., BRADENTON, FL 33508
 MANASOTA IBM-PC USER GROUP, 1102 MALLORIA DR., BRADENTON, FL 33529, 813-792-5400
 MANASOTA 99 USERS GROUP, 6625 ROXBURY DR., SARASOTA, FL 33581
 MARION COUNTY COMPUTER SOCIETY, PO BOX 248, 2950 NE 55th AVE., SILVER SPRINGS, FL 32688
 MIAMI APPLE USERS GROUP, c/o STEVE KRAMER, 5701 COLLINS AVENUE, MIAMI BEACH, FL 33140, (305) 868-5507
 NSIG-ELF - (MIAMI SPECIAL INTEREST GROUP-ELF), 656 NE 164 ST., N. MIAMI BCH, FL 33162
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 NSIG-S100 - (MIAMI SPECIAL INTEREST GROUP-S100 BUS), 656 NE 164 ST., N. MIAMI BCH, FL 33162
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 NATIONAL PUBLIC DOMAIN USERS GROUP, FOR OSBORNE I COMPUTERS, PO BOX 1442, ORANGE PARK, FL 32067-1447
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 PC USERS GROUP OF FLORIDA, PO BOX 9266, FT. LAUDERDALE, FL 33310
 PINELLAS IBM-PC USERS GROUP, 3401 GANDY BLVD. LOT #628, PINELLAS PARK, FL 33566, (813) 576-2608
 POLK APPLE CORE, 954 W. LEXINGTON ST., LAKELAND, FL 33801
 SUNCOAST APPLE USERS GROUP, PO BOX 7488, CLEARWATER, FL 33158, 1ST TUESDAY OF EACH MONTH, CLEARWATER CENTRAL CATHOLIC HIGH SCHOOL, 7:00 PM, FOR MORE INFORMATION CALL (813)531-7190

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 SOUTH FLORIDA COMPUTER GROUP, FT. LAUDERDALE SECTION, PO BOX 22267, FT. LAUDERDALE, FL 33335-2267
 SOUTH FLORIDA COMPUTER GROUP, MIAMI SECTION, 240 N.W. 203 TERRACE, MIAMI, FL 33169
 SPACECAST APPLE USER'S GROUP, PO BOX 2112, MERRITT ISLAND, FL 32952
 SPACECAST MICROCOMPUTER, 315 INLET AVE., MERRITT ISLAND, FL 32952
 SPACE COAST NEC USERS GROUP, c/o FRANK SCHNEIDER, 70 CEDAR AVE., UNIT #1, COCOA, FL 32931
 SUNCOAST 99ERS TI USERS CLUB, 6623 12 TERRACE N., ST. PETERSBURG, FL 33710
 TALLAHASSEE AMATEUR COMP SOCIETY, PO BOX 6716, TALLAHASSEE, FL 32314
 TAMPA BAY COMMODORE CLUB, PO BOX 23952, TAMPA, FL 33623
 TAMPA BAY TI99ER USERS GROUP, 13097 LOIS AVE., SEMINOLE, FL 33542
 TAMPA BAY TRS-80 USERS GROUP, PO BOX 76001, ST. PETERSBURG, FL 33734
 THE COMMODORE COMPUTER GROUP, PO BOX 9726, JACKSONVILLE, FL 32208. ATT: DAVID PHILLIPS OR DWAYNE MAYES
 THE DAYTONA 99ERS, PO BOX 4594, S. DAYTONA, FL 32021
 THE SOUTH FLORIDA ZX USERS GROUP, PO BOX 057381, WEST PALM BEACH, FL 33405
 THE TAMPA BAY KAYPRO USERS GROUP, 14 CYPRESS DR., PALM HARBOR, FL 33563
 THE 99ER TI USERS GROUP, PO BOX 1381, MAITLAND, FL 32751
 TI 99/4A PO BOX 1119, DAVENPORT, FL 33837
 TI PROGRAMMABLE CALCULATOR CLUB, TI PPC NOTES, PO BOX 1421, ARGO, FL 34294-1421
 TI SPACE COAST 99ERS, 357 WILFORD DRIVE, MERRITT ISLAND, FL 32952. ATT: DARRELL PETERSON
 TIMEX AND SINCLAIR BAY AREA MICROCOMPUTER USERS GROUP, PO BOX 644, SAFETY HARBOR, FL 33572
 U.S.F. IBM PC USERS GROUP, SVS 409 UNIVERSITY OF SOUTH FLORIDA, 4202 E. FOWLER AVE., TAMPA, FL 33620. ATT: DR. LOWITT
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 WEST VAX 99ers, Box 176, ORANGE PARK, FL 32067
 Z-HUG OF FORT PIERCE, 800 VIRGINIA AVE., SUITE 4, FT. PIERCE, FL 33450
 Z-X TIMEX GROUP, 950 CYNTHIA DR., TITUSVILLE, FL 32780

GEORGIA

ACS, POB 888771, ATLANTA, GA 30305
 ATLANTA C-64 USERS GROUP, 1767 BIG VALLEY LANE, STONE MOUNTAIN, GA 30083
 ATLANTA COMPUTER SOCIETY, PO BOX 888771, ATLANTA, GA 30356
 ATLANTA COMPUTER SOCIETY ATARI SIG, 156 LEARNER COURT, MARIETTA, GA 30060
 ATLANTA CONTACT ATARI GROUP, c/o N. CRANE, 779 ROLLINGWOOD DRIVE, STONE MT., GA 30087
 ATLANTA 99/4A USERS GROUP, PO BOX 19841, ATLANTA GEORGIA 30356
 COLUMBUS 99/4A USERS GROUP, 3434 FLINT DR., COLUMBUS, GA 31907
 CSRA COMPUTER CLUB, PO BOX 284, AUGUSTA, GA 03903
 MHUG, PO BOX 92, WARNER ROBINS, GA 31093
 NEVADA COBAL USERS GROUP, 5536 COLBERT TRAIL, NORCROSS, GA 30092
 POLY USERS GROUP, 1437 SUGARWOOD LN., NORCROSS, GA 30093
 SAVANNAH COMP USERS GROUP, PO BOX 14364, SAVANNAH, GA 31404
 SINC-9000, 362 PEACHTREE AVENUE, ATLANTA, GA 30305
 STATESBORO TRS-80 USERS GROUP, c/o DR. RUSSELL A. DEWEY, 223 N. EDGEWOOD DR., STATESBORO, GA 30458
 THE ATLANTA NORTHSTAR USER'S GROUP, PO BOX 98397, ATLANTA, GA 30359
 TRS-80 USER'S GROUP OF ATLANTA, 1637 COLUMBIA DR., DECATUR, GA 30034

HAWAII

ALOHA 99/4A USERS GROUP, c/o PHILLIP MARKHAM 92865 PALAIAI ST., MAKAKILO, HI 96706
 CHAINMADE UNIVERSITY COMPUTER WORKSHOP, 3140 WAIALAE AVE., HONOLULU, HI 96861
 HAWAII PORTABLE COMPUTER USERS GROUP, c/o COMPUTER MARKET, HECTOR ROBERTSON, PRES., 578 ALA MOANA BLVD., HONOLULU, HI 96813

IDAHO

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 IDAHO FALLS COMPUTER CLUB, 1890 EAST 25TH, IDAHO FALLS, ID 83401
 POCATELLO COMMODORE USERS, c/o RICHARD HARKER, 421 S. MAIN, POCATELLO, ID 83204
 POCATELLO MICROCOMPUTER CLUB, 361 PARK WAY DR., POCATELLO, ID 83201
 POCATELLO ORGANIZATION OF WRITERS IN LOGO (O.W.L.), c/o WILLIAM J. MCCURDY, 2946 S. 5TH AVE., POCATELLO, ID 83204, 208-233-5422

ILLINOIS

APPLEPEOPLE USERS GROUP, PO BOX 333, CRYSTAL LAKE, IL 60014
 CACNE, CHICAGO AREA COMPUTER HOBBYISTS EXCHANGE, 323 S. FRANKLIN #804, BOX 176, CHICAGO, IL 60606
 CHICAGOLAND ATARI USERS GROUP, 520 N. WOOD DALE RD., WOOD DALE, IL

Users Groups

LIST YOUR CLUB'S NAME AND ADDRESS COMPLIMENTS OF COMPUTER SHOPPER

Call or Write: (305) 269-3211; P.O. Box F, Titusville, FL 32780

CHICAGOLAND KAYPRO USERS GROUP, 605 ILLINOIS RD. WILMETTE, IL 60091
CHICAGO AREA NORTHSTAR USERS GROUP, PO BOX 9, PARK RIDGE, IL 60068
CHICAGO AREA T-BUG, TANDY BUSINESS USERS GROUP, 26940 NORTH LONGWOOD RD., PO BOX 631, LAKE FOREST, IL 60045
CHICAGO'S FIRST OSBORNE CLUB, C/O ROB TROXEL, PO BOX 943, LIBERTYVILLE, IL 60048
CHICAGO T1994A USERS GROUP, TRITON COLLEGE, RIVER GROVE, IL
CIRCLE CHESSCOMPUTER CLUB, PO BOX 63, DES PLAINES, IL 60017
COUNTY OF LAKE APPLE CLUB, 470 NORTH LAKE STREET, MUNDELEIN, IL
CRABAPPLES, RR #8, CARBONDALE, IL 62901
DC/DENAL COMPUTER GROUP, C/O E.J. NEIBURGER, 1000 NORTH AVE., WAUKEGAN, IL 60085
EXPLORATIONS EXPLORER-85 S-100, C/O LEROY W. MARSHALL, 808 VASSAR LANE, SCHAUMBURG, IL 60193
FOX VALLEY TRS-80 USER GROUP, 129 S. LINCOLN WAY, N. AURORA, IL 60542
ILLINOIS COLOR COMPUTER CLUB OF ELGIN, 720 RAYMOND STREET, ELGIN, IL
JOLIET APPLE USERS GROUP, 101 SPRINGFIELD AVE., JOLIET, IL
K*3 USERS GROUP, RT. 2, BOX 203, MOMENCE, IL 60954
MAX—"USERS GROUP, 5201 MILWAUKEE AVE., 2ND FLOOR, CHICAGO, IL
MID ILLINOIS APPLE USERS GROUP, PO BOX 526, EFFINGHAM, IL 62401
MID ILLINOIS COMP. RESOURCE ORGANIZATION, PO BOX 766, BLOOMINGTON, IL 61701
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994A OWNER USERS GROUP, 8602 DORR RD., WONDER LAKE, IL 60097
NORTHERN ILLINOIS APPLE USERS GROUP, 1271 WEST DUNDEE RD., BUFFALO, GROVE, IL 60090
NORTHERN ILLINOIS COLOR COMPUTER CLUB, 1217 KINGS COURT #12, WEST CHICAGO, IL 60185
NORTHERN ILLINOIS COMPUTER OWNERS, 26 W. 484 BUTTERSFIELD, WHEATON, IL 60187
NORTHERN ILLINOIS IBM-PC USERS GROUP, UNION OIL BUILDING, SCHAMBERG, IL
ONE ON ONE, 948 PROSPECT AVE., ELMHURST, IL 60126
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PUBLIC ACCESS MICROCOMPUTER USERS GROUP, ARLINGTON HEIGHTS MEMORIAL LIBRARY, 500 NORTH DUNTON, ARLINGTON HTGS., IL 60004
S.U.N., SINGLAR USERS NETWORK, 2170 OAK BROOK CIRCLE, PALATINE, IL 60067
SINCLAIR END USERS' GROUP, C/O DIANA WRIGHT, 2170 OAKBROOK CIRCLE, PALATINE, IL 60067
SOUTH SUBURBAN MICROCOMPUTER USER GROUP, FREEDOM HALL, 410 LAKEWOOD BLVD., PARK FOREST, IL
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WACO (WOODFIELD AREA COMPUTERIST'S ORGANIZATION), QUINLAN & TYSON BLDG., SCHAUMBURG, IL 60194
WESTERN ILLINOIS PET USERS GROUP, RTE. 5, BOX 75 QUINCY, IL 62310
WILL COUNTY COMPUTER USERS, LOCKPORT LIBRARY, 8TH & HAMILTON, LOCKPORT, IL
WOODFIELD AREA COMPUTERIST ORG., PO BOX 94781, SCHAUMBURG, IL 60194
Z-80 STARTER KIT USER'S GROUP, 6000 PUFFER RD., DOWNERS GROVE, IL 60516

INDIANA

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COMMODORE COMPUTER CLUB, 3814 TERRA TRACE, EVANSVILLE, IN 47711. C/O JOHN PATRICK
COMPUTERS FOR PROFIT CLUB, PO BOX 13075, FORT WAYNE, IN 46867
CP/MORROW GROUP OF INDIANA, 57 VINE ST., HUNTINGTON, IN 46750
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HOOSIER USERS GROUP, PO BOX 34334, INDIANAPOLIS, IN 46734
INDIANA HEATH USERS GROUP, 5113 DICKSON RD., INDIANAPOLIS, IN 46226
INDIANAPOLIS SMALL SYSTEMS GROUP, PO BOX 40733, INDIANAPOLIS, IN 46240
KOKOMO APPLE USERS GROUP, 2315 W. JEFFERSON ST., KOKOMO, IN 46901
LAUG - LAFAYETTE APPLE USERS GROUP, 519 SOUTH 31st ST., LAFAYETTE, IN 47904
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MIAMI COUNTY AREA 994A HOME COMPUTER USERS GROUP, 163 W. 3rd, PERU, IN 46970
MIAMI COUNTY AREA 994A HOME COMPUTER USERS GROUP, PO BOX 1194, PERU, IN 46970
MUNCIE PC USERS GROUP, 2809 E. JACKSON ST., MUNCIE, IN 47303
NORTHEAST COMPUTER CLUB, PO BOX 50252, INDIANAPOLIS, IN 46250
SOUTHERN INDIANA COMPUTER CLUB, RT. 1, BOX 459, MITCHELL, IN 47446
THE CENTER COMPUTER ORGANIZATION, PO BOX 6031, SOUTH BEND, IN 46660-6031
TIMEK 1000 NATIONAL SOFTWARE EXCHANGE, C/O GREG GUNTHORP, RR2 BOX 162, LaGRANGE, IN 46761

IOWA

AMES IOWA APPLE USERS GROUP, 213 LINCOLN WAY, AMES, IOWA 50010
CEDAR VALLEY 99ER USERS GROUP 2705 16TH AVENUE, MARION, IA 52303
CENTRAL IOWA 994A USERS GROUP, 3013 EAST 32ND STREET, DES MOINES, IA 50317
CENTRAL IOWA 994A USERS GROUP, C/O ROBERT UTTER, 3013 E. 32ND ST., DES MOINES, IA 50317
COMPUTER USERS CLUB, 1101 S. 2ND AVE., MARSHALLTOWN, IA 50158

EASTERN COMP CLUB, BOX 164, HIAWATHA, IA 52233
HAKATARI, 2564 22ND AVE., MARION, IA 53202, ATTN: JOHN WIESE
HAWKEYE - PC, IBM PC USERS GROUP, 385 COLLINS RD. N.E. SUITE 201, CEDAR RAPIDS, IA 52404
IOWA, 7 TIMBERLANE DR., CLEAR LAKE, IA 50428
IOWA USER GROUP, 844 10 ST. N.E., MASON CITY, IA 50401
MIDWEST ATARI GROUP, IOWA CHAPTER (MAGIC), 1125 3RD ST., NEVADA, IA 50201
QUAD CITY COMPUTER CLUB, 215 MAIN ST., #515, DAVENPORT, IA 52801
THE GREEN APPLES, BOX 622, CEDAR FALLS, IA 50613

KANSAS

APPLE BITS, 6140 GLENWOOD, MISSION, KS 66202
COMMODORE USERS GROUP OF WICHITA, ROUTE 1, BOX 115, VIOLA, KS 67149
KANSAS CITY METRO USER'S GROUP, 7010 CAENEN AVENUE, SHAWNEE, KS 66216
LAWRENCE ATARI COMPUTER CLUB (LACC), PO BOX 1415, LAWRENCE, KS 66044
MIDAMERICA 99 USERS GROUP, PO BOX 2505, SHAWNEE, KS 66201
THE PLANE APPLE CLUB, PO BOX 47396, WICHITA, KS 67201
TI INTEREST GROUP, 5522 EAST HARRY, WICHITA, KS 67218
WALTER LOUNSBERRY, 739 LITCHFIELD, WICHITA, KS 67203

KENTUCKY

APPLE SIDERS OF CINCINNATI, C/O GARY JOHNSTON, PRESIDENT, 27 CRYSTAL LAKE DR., COVINGTON, KY 41017
C*BUG THE COMMODORE BARDSTOWN USER GROUP, PO BOX 165, BARDSTOWN, KY 40004, 502-348-6380
COLOR COMPUTER OF LEXINGTON, C/O SCOTT SEHLHORST, 3401 TISDALE DR., LEXINGTON, KY 40503
KENTUCKIANA 994 COMPUTER SOCIETY, 9801 TIVERTON WAY, LOUISVILLE, KY 40222
KENTUCKY OSBORNE GROUP, C/O JOHN WARNER, PRES., 219 BURNAM CT., RICHMOND, KY 40475
KIPBUG, PO BOX 3564, LOUISVILLE, KY 40201, PRES. ROBERT D. HASTINGS, PHONE: (502)589-0254
L.U.C.K.Y. (LOUISVILLE USERS OF COMMODORE IN KENTUCKY), C/O DAVE BOROUGHS, PO BOX 22244, LOUISVILLE, KY 40222
OWENSBORO MICRO COMPUTER CLUB, 3936 YATES DR., OWENSBORO, KY 42301
THE COMMODORE CONNECTION, C/O JIM KEMP, 1010 S. ELM, HENDERSON, KY 42420

LOUISIANA

ATARI PROGRAM ENTHUSIASTS OF SLIDELL, 117 DRURY LN., SLIDELL, LA 70460, 504-649-6586
B.R.A.G., BATON ROUGE ATARI GROUP, 1955 DALLAS DR., BATON ROUGE, LA 70806
BATON ROUGE COMPUTER CLUB, PO BOX 80648, BATON ROUGE, LA 70898-0648
BATON ROUGE PC USERS GROUP, C/O TOMWISHER, 3375 KING BRADFORD, BATON ROUGE, LA 70816
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MAINE

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COLOR COMPUTER MAGAZINE, HIGHLAND MILL, CAMDEN, ME 04843
994A USER GROUP OF SOUTHERN MAINE, ATTN: JOHN LEEKE, RRI BOX 847, SANFORD, ME 04073
SO. ME. 64, C/O ED MOORE, 9 LYNDIA ROAD, PORTLAND, ME 04103
SOUTHERN MAINE TRS-80 USERS GROUP, 82 WELLINGTON ROAD, PORTLAND, ME 04103
TRANET, PO BOX 567, RANGELEY, ME 04970

MARYLAND

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CUMBERLAND VALLEY APPLE USER'S GROUP, 806 FREDERICK ST., HAGERSTOWN, MD 21740
E-COM USERS GROUP, INC., BOX 888, RIVERDALE, MD 20737, C/O DELILA TROUP
EDISON COMMODORE USERS GROUP, 4314 OXFORD DR., SUITLAND, MD 20746
FREDERICK APPLE CORE, 1835 MEADOWGROVE LANE, FREDERICK, MD 21701
GAITHERSBURG C-64 USERS GROUP, 12937 PICKERING DR., GERMANTOWN, MD 20874
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SOUTHERN MD COMMODORE USERS GROUP, 6800 KILLARNEY ST., CLINTON, MD 20735
SOUTHERN MARYLAND APPLE USERS GROUP, PO BOX 398, LEXINGTON PARK, MD 20653
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THE BOYDS CONNECTION, 21000 CLARKSBURG, RD., BOYDS, MD 20841
THE COMPUCATS, 680 WEST BEL AIR AVENUE, ABERDEEN, MD 21001
THE MONTGOMERY COUNTY COMMODORE COMPUTER SOCIETY, PO BOX 6444, SILVER SPRING, MD 20906, (301) 946-1564
TRS-80 USERS GROUP OF BALTIMORE, 102 N. COLLINGTON AVE., BALTIMORE, MD 21231
VICLQUE (LINTHICUM HEIGHTS), 105A, CODDIUT ST., ANNAPOLIS, MD 21401
WASHINGTON APPLE PI, 8227 WOODMONT AVE., SUITE 201, BETHESDA, MD 20814

MASSACHUSETTS

APPLESAUCE, 118 BROOKHAVEN DR., E. LONGMEADOW, MA 01208
APPLESEED, THE CENTRAL MASSACHUSETTS APPLE USERS GROUPS, PO BOX 62, WORCESTER, MA 01614
BOSTON COMPUTER SOCIETY, 17 CHESTNUT ST., BOSTON, MA 02108
BOSTON KAYPRO USERS GROUP, 3 CENTER PLAZA, BOSTON, MA 02108
M.U.N.C.H., 1241 MAIN ST., WORCESTER, MA 06103
NICO, PO BOX 6502, CHELMSFORD, MA 01824
MAGNETIC (TI 994A), 57 RIVER RD., ANDOVER, MA 01810
MITRE SMALL COMPUTER SOCIETY, MITRE CORP., C/O M. THEODORE, BEDFORD, MA 01730
NBE BIRD WATCHERS' COMPUTER CLUB, 31 PLUMMER AVENUE, NEWBURYPORT, MA 01950
NEW ENG. COMP SOC, PO BOX 198, BEDFORD, MA 01730
NEWTON APPLE KIDS, 77 ROCKPORT RD., WESTON, MA 02193
NORTH SHORE APPLE GROUP, PO BOX 59, ROCKPORT, MA 01956
PET USERS GRP, WALTHAM HS. NOSTON, MA 02154
SMUDGE (DIGITAL GROUP), C/O JEB BOSWELL, M.D., 29 KENILWORTH ST., NEWTON, MA 02158
SYNTAX - THE HARVARD GROUP, RD. 2, BOX 457, HARVARD, MA 01451
THE APPLE GUILD, PO BOX 371, WEYMOUTH, MA 02188
THE BOSTON COMPUTER SOCIETY, ONE CENTER PLAZA, BOSTON, MA 02108
TRUGEM - TRS-80 USERS GROUP OF E. MA., C/O M. SLATE, 42 OAK HILL RD., SUDBURN, MA 01776

MICHIGAN

ALTERNATE SOURCE, 704 N. PENNSYLVANIA AVE., LANSING, MI 48906
APPLE L.U.G., PO BOX 271, HASLET, MI 48840
BASIC 99ER'S, 1504 S. VASSAR RD., BURTON, MI 48509, (313) 742-1329
BASIC VIC, C/O BRIAN BROWN, 1504 S. VASSAR, BURTON, MI 48509, (313)742-1329
BATTLE CREEK MICROCOMPUTER CLUB, 8587 Q DR., NORTH BATTLE CREEK, MI 49017
CAPITOL HILLA TARI OWNERS SOCIETY (C.A.O.S.), PO BOX 16132, LANSING, MI 48901
CENTRAL MI TRS 80, 220 E. KALAMAZOO, LANSING, MI 48932
CENTRAL MICHIGAN TRS-80 USERS GROUP, 1309 WOODINGHAM DR., EAST LANSING, MI 48823
COLOR COMPUTER OWNER'S GROUP, PO BOX 1113, DEARBORN, MI 48121
DETROIT INTERACT GROUP, 15356 PREVOST, DETROIT, MI 48227
DETROIT FIRST OSBORNE USERS GROUP, 17452 STAMWICK, LIVONIA, MI 48152, (313) 422-0928
ERCC EDUCATIONAL, RECREATIONAL COMPUTER CLUB, PO BOX 325, OWOSSO, MI 48867
Himi 65XX-68XX USER GROUP, PO BOX 4310, FLINT, MI 48504
GRAND RAPIDS APPLE (GRAPPLE), 5326 BROOKWOOD DR. S.E., KENTWOOD, MI 49508
GRAND RAPIDS 99 USERS GROUP, BOX 1649, GRAND RAPIDS, MI 49501
GREAT LAKE 99ER'S, PO BOX 7151, ROSEVILLE, MI 48305
HEATH USER'S GROUP, HILLTOP RD., ST. JOSEPH, MI 49085
KALAMAZOO AREA COMPUTER ASSOCIATION, 1927 WINCHELL AVE., KALAMAZOO, MI 49008
LAKE SHORE COMPUTER USERS, PO BOX 5062, MUSKEGON, MI 49445
LOWER MICHIGAN 994A USERS GROUP, PO BOX 885, TROY, MI 48069
MACE - MICHIGAN ATARI COMPUTER ENTHUSIASTS, PO BOX 2785, SOUTHFIELD, MI 48037
MICHIGAN APPLE COMPUTER CLUB, PO BOX 551, MADISON HEIGHTS, MI 48071
NATIONAL TRS-80 MODEL II USERS GROUP, PO BOX 234, ADA, MI 49301
SAULT AREA TRS-80 USERS GROUP, C/O JACK DECKER, 1804 WEST 18TH ST. #155, SAULT STE. MARIE, MI 49783
SCREAMING EAGLES, C/O CLARENCE PERRY, 1131 GREENBRIAR, JEROME, MI 49249
SEMCO, SOUTH EASTERN MICHIGAN COMPUTER ORGANIZATION, PO BOX 02426, DETROIT, MI 48202
SOFT TYPE, 19480 AVON, DETROIT, MI 48219
SORCERER'S APPRENTICE, PO BOX 33, MADISON HEIGHTS, MI 48071
TRI-CUG, COMMODORE USERS GROUP, PO BOX 45, BAY CITY, MI 48706, C/O MARK D. MEYERS
TRI-CUG, COMMODORE, 1013 NORTH JOHNSON, BAY CITY, MI 48706

WEST OAKLAND COMPUTER USERS GROUP (TRS-80), 1691 EASON, PONTIAC, MI 48054

MINNESOTA

CP/M USERS GROUP OF MINNESOTA, C/O JONATHAN THOMAS, 8040 N.E. GROVELAND RD., MONDSVIEW, MN 55432
HEARTLAND AREA COMPUTER COOPERATIVE, RT. 4, BOX 204, LITTLE FALLS, MN 56345
MINN'APPLES, PO BOX 796, HOPKINS, MN 55343
MINN COMP SOC, 8100 34TH AVE. S., MINNEAPOLIS, MN 55401
MSP 99 USERS GROUP, PO BOX 12351, ST. PAUL, MN 55112
99 COMPUTER GROUP, 5916 FRANCE AVE. S., EDINA, MN 55410
ORGANIZATION OF SOUTH EASTERN MINNESOTA OHIO SCIENTIFIC USERS (OSMOSIS), 3218 SILVER LAKE RD., MINNESOTA, MN 55418
SMUGH (ST. PAUL - MINNEAPOLIS USERS GROUP - HEATH), 8895 72ND ST., COTTAGE GROVE, MN 55016
THE APPLERS, C/O KEITH KRUEGER, RR 2 BOX 106, LAKE CITY, MN 55041 (612)345-4380
THE REAL APPLE, 395 WOODLAWN AVE., ST. PAUL, MN 55105

MISSISSIPPI

ATARI USERS GROUP, 4550 W. BEACH BLVD., BILOXI, MS 39534, 601-388-4709
BILOXI COMMODORE USERS GROUP, 4550 W. BEACH BLVD., BILOXI, MS 39534, 601-388-4709
CANTON COLOR COMPUTER CLUB (TRS-80), C/O WADER HAMPTON, PO BOX 87037, CANTON, MS 38187
FRANKLINAPPLE USERS GROUP, 4550 W. BEACH BLVD., BILOXI, MS 39534, 601-388-4709
GUM TREE COMPUTER CLUB TRS-80 & APPLE, 2609 PEMBERTON, TUPELO, MS 38801, C/O RICHARD SWINEY
IBM USER GROUP, 3002 HWY., 90 E. OCEAN SPRINGS, MS 39564, 601-875-1173
IBM USER GROUP, 4550 W. BEACH BLVD., BILOXI, MS 39534, 601-388-4709
MISSISSIPPI STATE UNIVERSITY MICROCOMPUTER USERS GROUP, C/O DR. GENE BOGGESS MSU COMPUTER CENTER, PO DRAWER CC, MISSISSIPPI STATE, MS 39762, 601-325-2942
O.S.U.G., OCEAN SPRINGSTHE COASTAL AREA ATARI USERS GROUP, PO BOX 5098, BILOXI, MS 39534. ATTN: LEE HITCHESON (601) 388-2836
SOFTWARE SOURCE, 4550 W. BEACH BLVD., BILOXI, MS 39531
TRS 80 USERS GROUP, 3002 HWY 90 E, OCEAN SPRINGS, MS 39564, 601-875-1173
TRS 80 USERS GROUP, 4550 W. BEACH BLVD., BILOXI, MS 39534, 601-388-4709
UNIVERSAL COMPUTER SERVICES, 3002 HWY 90E, OCEAN SPRINGS, MS 39564
VIC 20 USERS GROUP, 3002 HWY 90E, OCEAN SPRINGS, MS 39564, 601-875-1173
VIC 20 USERS GROUP, 4550 W. BEACH BLVD., BILOXI, MS 39534, 601-388-4709

MISSOURI

APPLEJACKS OF ST. LOUIS, C/O KENT D. WILBUR, 12 JENY LIND DR., ST. PETERS, MO 63376
COLUMBIA KAYPRO USERS GROUP, CMS STORE, HITT & BROADWAY, COLUMBIA, MO 65201
GREATER KANSAS CITY TRS-80 USERS, PO BOX 27, BELTON, MO 64012
JOPLIN APPLE USER GROUP, 1903 E. 36TH, JOPLIN, MO 64801
KANSAS CITY AND INDEPENDENCE PET USERS GROUP, 10524 LAKE DR., INDEPENDENCE, MO 64053
NORTH COUNTY TRS-80 USERS GROUP, 12 VILLE DONNA COURT, HAZELWOOD, MO 63042
ST. LOUIS COMPUTER GROUP, 5600 CLAYTON RD., ST. LOUIS, MO 63110
ST. LOUIS 99ERS, 3429 PESTA LOZZI, ST. LOUIS, MO 63118
SLACC, POB 28924, ST. LOUIS, MO 63132
SLUG - ST. LOUIS KAYPRO USERS GROUP, C/O JOANNA DANEMAN, BOX 31126, ST. LOUIS, MO 63131
THE TRS-80 MODEL II, 12, & 16 INTERNATIONAL USERS GROUP, C/O ROBERT SOKOL, 8437 BELLEVUE, KANSAS CITY, MISSOURI 64114
TEXAS INSTRUMENTS LICKING USERS' GROUP (LUG'S), PO BOX 439, LICKING, MO 65542-0439

MONTANA

BIG SKY APPLE USERS GROUP, 3400 5TH AVE. SOUTH, GREAT FALLS, MT 59405
BIG SKY 99ers, PO BOX 1044, GREAT FALLS, MT 59403

NEBRASKA

CROSS RDS. 99ers COMPUTER GROUP, PO BOX 293, YORK, NE 68467
LINCOLN MICRO-COMPUTER CLUB, 1209 GARBER AVE., LINCOLN, NE 68521
LNU USERS, 4345 MANCHESTER RD., GRAND ISLAND, NE 68801
MID-AMER. COMP. COMM FED S.L. BELLEVUE, NE 68005
MID-AMERICA COMPUTER HOBBYISTS (MACH), PO BOX 13303, OMAHA, NE 68113
OMAHA APPLE SAUCE, 3103 S. 32 AVE., OMAHA, NE 68105
SOUTH CENTRAL NEBRASKA APPLE COMPUTER KLUB (SNACK), C/O ROCKY & DOROTHY FRIEND, PO BOX 2064, HASTINGS, NE 68901

NEVADA

LAS VEGAS TRS-80 USERS GROUP, 1941 ASHANER LN., LAS VEGAS, NV 89115

NEW HAMPSHIRE

NEW HAMPSHIRE 99ERS USER GROUP, INC., PO BOX 7199, HEIGHTS STATION, CONCORD, NEW HAMPSHIRE 03301

NEW HAMPSHIRE ATARI COMPUTER CLUB, 346 S. TAYLOR ST., MANCHESTER, NH 03103
NO N ENG COMP SOC, 2500 RIVER RD, NH 03104
PENI-BAKER COMPUTER USERS GROUP, RFD 2 BOX 399, PLYMOUTH, NH 03264
SEACOAST MICRO-COMPUTER CLUB, 3 PINE ST., ROLLINSFORD, NH 03869, C/O LESLIE

NEW JERSEY

AMATEUR COMPUTER GROUP OF NJ, PO BOX 319, SOUTH BOUND BROOK, NJ 08880, ATTN: RUSSEL CORR
AMATEUR COMPUTER GROUP OF NEW JERSEY APPLE CLUB, 5 BAYBERRY CLOSE, PISCATAWAY, NJ 08854
APPLE JACK, 7 STONEHEDGE RD., MORRISTOWN, NJ 07960, 201-538-8746
CENTRAL JERSEY COMPUTER CLUB, C/O RIHARD H. WILLIAMS, RD. #1 BOX 147, HOPEWELL, NJ 08525
COMPUTER CLUB OF OCEAN COUNTY, 1319 GEORGIAN TERRACE, LAKEWOOD, NJ 08701
COMPUTER CLUB OF OCEAN COUNTY, 400 SURF AVENUE, BEACHWOOD, NJ 08722
COMPUTER WORKSHOP ATARI USERS GROUP, 1200 HAD-ONFIELD RD., CHERRY HILL, NJ 08002
EWING APPLE USERS GROUP, C/O BOB AUSTIN, NJ SCHOOL FOR THE DEAF, WEST TRENTON, NJ 08628
JERSEY ATARI COMPUTER GROUP, 58 DEWEY AVE., HIGH BRIDGE, NJ 08829
LABCOM USERS GROUP, DARTMOUTH-HITCHCOCK MEDICAL CENTER, HANOVER, NJ 03756
JERSEY ATARI COMPUTER SOCIETY, C/O NEIL SHERMAN, 1908 WEST POINT DR., CHERRY HILL, NJ 08003
MID-JERSEY EXECUTIVE COMPUTING GROUP, C/O DR. C.T. PHAN, RIDGE COLLEGE, POB 6400, LAWRENCEVILLE, NJ 08648
MID-JERSEY PC GROUP, GRADUATE PROGRAM FOR ADMINISTRATORS, POB 6400, LAWRENCEVILLE, NJ 08648
MONMOUTH APPLE CORPS INC., PO BOX 3356, WEST END, N.J. 07740, (201) 229-8299
MONMOUTH COUNTY APPLE USERS GROUP, SEAVIEW SQUARE MALL AUDITORIUM, RT 35 AND RT 66, WANAMASSA, NJ
MORRIS COUNTY TIMEX USERS GROUP, LARRY SPENCER, 6 FOREST CT., MORRIS PLAINS, NJ 07950
NEW JERSEY USERS GROUP, RD-1, 40 WOODLAWN TERRACE, LK. HOPATCONG, NJ 07849
NEW YORK METRO LUG GROUP, 1 MARK RD, KENILWORTH, NJ 07033
9900 USERS GROUP, PO BOX K, MOORESTOWN, NJ 08057
NORTH JERSEY TRS-80 USERS GROUP, C/O DR. HOWARD SILVER, FAIRLEIGH DICKINSON UNIVERSITY, TEANECK, NJ 07666
NORTH JERSEY COMPUTER USERS GROUP, PO BOX 382, SPARTA, NJ 07871
NORTHERN NJ COMPUTER CLUB, C/O HERMAN SACHS, 6 BRYSON RD., FAIRLAWN, NJ 07410
THE APPLE COMPUTER CLUB, C/O R.L. BARNES, RM 6D-214, BELL LABS, MURRAY HILL, NJ 07974
THE CENTRAL JERSEY 99 COMPUTER CLUB, PO BOX 673, BRICK, NJ 08723, C/O THEODORE E. MOZER, III
TEH COMPUTER/INVESTOR USERS GROUP, 36 HIGHLAND AVENUE, METUCHEN, NJ 08840
TI USERS, NEWJUG, 981 TOWNLEY AVE., UNION, NJ 07083
TRS-80 USERS GROUP OF CHERRY HILL, PO BOX 61, NEW LISBON, NJ 08064
TRS-80 USERS GROUP OF CHERRY HILL, BRYAN PcpHEE - PRESIDENT, 418 VIRGINIA DR., BROWNS MILLS, NJ 08015
TRS-80 USERS GROUP OF MONMOUTH COUNTY, 80 BINGHAM AVENUE, RUMSON, NJ 07760

NEW MEXICO

APPLEQUERQUE COMPUTER CLUB, 1213 CALIFORNIA NE, ALBUQUERQUE, NM 87110
ROCKS GROUP, GALLUP AEROSTAT SOCIETY, 1203 KIVA, GALLUP, NM 87301
THE SANTA FE COMPUTER SLUB, PO BOX 2261, SANTA FE, NM 87504

NEW YORK

ADAM MICRO-HACKERS, 236 McKIBBEN STREET, SUITE 19, NY, NY 11206
AMA, 135 W. 50TH ST., NEW YORK, NY 10020
ANSI, 1430 BROADWAY, NEW YORK, NY 10018
APPLE BYTTERS CORPS, C/O HANK KOLK, 171 TREEHAVEN RD., BUFFALO, NY 14215
APPLE-CP/M-IBM USERS GROUP, 737 EMPIRE AVENUE, FAR ROCKAWAY, N.Y. 11691
BASIS 108 USERS, C/O PERSONALCOMPUTER SERVICE, 52 JACKSON DRIVE SOUTH, POUGHKEEPSIE, NY 12603
CPA APPLE USERS GROUP, C/O BARRY LEIF, 469 SEVENTH AVE., NEW YORK, NY 10018
CPM/APPLE USERS GROUP, 737 EMPIRE AVENUE, FAR ROCKAWAY, NY 11691
CPM USERS GROUP, 345 E. 86 ST., NEW YORK, NY 10028
CPM USER GROUP, RT. 1 BOX 244, MILL RD., YAPHANK, NY 11980
COCO NEWS, 3 BOHR CT., SPRING BALLEY, NY 10977
COLOR COMPUTER CLUB OF NEW YOUR, 347 WEST 48TH ST., NEW YORK, NY 10036
COMPUTER CLUB OF AMERICA AND EXCHANGE, PO BOX 784, BRONX, NY 10473
CRAB APPLE, PO BOX 268, WEST NYACK, NY 10994
DATA GENERAL USERS GROUP, C/O DAVE BELLIN, PO BOX 929, RIVERDALE, NY 10463
DIGITAL GROUP INDEPENDENT USER'S GROUP, PO BOX 316, WOODMERE, NY 11598
FORTH INTEREST GROUP, C/O TOM JUNG, PO BOX 452, EAST ELMHURST, NY 11369
FORTH INTEREST GROUP, C/O TOM JUNG, 7-04 166 STREET, 88, BEECHURST, NY 11357
FUTURE COMPUTER PRODUCTS USERS GROUP, 67 MAPLE ST., NEWBURGH, NY 12550
HEATH USERS GROUP OF NY, C/O RALPH BRADBURN, 300 RT. 59, TALLMAN, NY 10982
HEATH USERS GROUP OF NJ (HUGNJ), C/O RALPH BRADBURN, 300 RT. 59, TALLMAN, NY 10982
INTERCALL, PO BOX 254, SCARSDALE, NY 10583
JERI-HUG, THE HEATH USERS GROUP, C/O HEATHKIT ELECTRONICS, 15 JERICHO TURNPIKE, JERICHO, NY 11753

Users Groups

LIST YOUR CLUB'S NAME AND ADDRESS COMPLIMENTS OF COMPUTER SHOPPER

Call or Write: (305) 269-3211; P.O. Box F, Titusville, FL 32780

JMSAM USERS GROUP, C/O JAMES P. ISCARO, PRES., BOX 274, RIVERDALE, NY 10463
KAYPRO USERS GROUP, PO BOX 100, MALVERNE, NY 11565
KINGS BYTE NEWSLETTER, 1063 EAST 84TH STREET, BROOKLYN, NY 11236
LION, LONG ISLAND OSBORNE NETWORK, PO BOX 190, OCEANSIDE, NY 11572
LIST (LON ISLAND SINCLAIR-TIMEX) GROUP, 10 IDLE DAY DRIVE, CENTERPORT, NY 11721
LNU USERS GROUP, RT. 1 BOX 244, MILL RD., YAPHANK, NY 11980
LONG ISLAND COMPUTER ASSOC., PO BOX 71, HICKSVILLE, NY 11802
LONG ISLAND NEC USERS GROUP, 75 WEAVING LN., WATKINS, NY 11793

METRO TRS-80 USERS GROUP, C/O GEORGE MUENEN, 310 WEST 106 STREET, 15D, NEW YORK, NY 10025
MICROAGE ATARI COMPUTER USER'S GROUP, PO BOX 200, HENRIETTA, NY 14467
MICRO-COMPUTER BUSINESS USERS GROUP, 161 W. 75 ST., NEW YORK, NY 10023
MOD 4 USERS GROUP, 1578 E. 26 ST., BROOKLYN, NY 11229

N.E.C.A., 11 DICKENS AVE., DIX HILLS, NY 11746
NATIONAL ADVANCED STOCK/COMMODITY MICRO GROUP, LOCK BOX 407, NEW YORK, NY 11362
NYU DISABLED STUDENT SERVICES, 566 LAGUARDIA PLACE, ROOM 701, NEW YORK, NY 10012
NEW YORK AMATEUR COMPUTER CLUB, INC., PO BOX 106, CHURCH ST. STATION, NYC, NY 10008
NY SANYO USER GROUP, PO BOX 182, TIMES PLAZA STATION, NY 11217

NORTH COUNTY TRS-80 2 & 16 CLUB, 24 WOODLAND TERRACE, LAKE PLACID, NY 12946
OLYMPIAN COMPUTER CLUB, C/O PAUL A. MULLENS, BOX 4277, APO NEW YORK 09223, CLUB IS IN ATHENS, GREECE AND IS LOCATED ON HELLENIKON AIR BASE AND CORRESPONDENCE CAN BE SENT THRU THE MILITARY MAIL SYSTEM BY USING HTE ABOVE ADDRESS.

PET PLACE, C/O BRIAN SPECTOR, 6 CAIL DR., E. ROCKAWAY, NY 11518
RICHARD G. WINSTON, DDS, 135 3RD AVENUE, MINEOLA, NY 11501

ROCHESTER AREA COMP, 1 LOMB MEM DR., ROCHESTER, NY 14623
S-100CPM USER'S GROUP, PO BOX 106, CHURCH ST. STATION, NEW YORK, NY 10008

SCENECTADY HUG, C/O T. BUDGE, 75 SANDERS ST., SCOTIA, NY 12302, WALTER HIPPLE 385-5660
SINCLAIR COMPUTER USER'S SOCIETY (SINCUS), PO BOX 36, JOHNSTON CITY, NY 13790

SOUTHERN TIER APPLE USER'S GROUP, (S.T.A.U.G.), PO BOX G, BRESFORD, NY 14816
STATEN ISLAND APPLE USERS GROUP, PO BOX 141, STATEN ISLAND, NY 10305

SUFFOLK COUNTY COMPUTER ASSOCIATION, RT. 1, BOX 244, MILL RD., YAPHANK, NY 11980
SYDOR'S M.U.G. UG, RT 52, CARMEL, NY 10512

SYRACUSE APPLE USERS GROUP, PO BOX 6586, SYRACUSE, NY 13217
SYRACUSE ATARI USERS GROUP, 103 WOODSPATH ROAD, LIVERPOOL, NY 13088

SYRACUSE OSBORNE USERS GROUP (SOUP), C/O MARTIN SHAPIRO, 601 CLAREDON ST., SYRACUSE, NY 13201
THE BASIS GROUP INT'L, NEW YORK CHAPTER, C/O BILL BASCH, 127 MADISON AVE., 2ND FLOOR, NEW YORK, NY 10016

THE DATAMERICA COMPUTER USER'S GROUP, 312 E. 84 ST., #1A, NEW YORK, NY 10028
THE ROCHESTER S-80 COMPUTER CLUB INC., PO BOX 15476, ROCHESTER, NY 14615

THE SYRACUSE APPLE USERS GROUP, PO BOX 6586, SYRACUSE, NY 13217
TRS 80 USER GROUP, RT. 1, BOX 244, MILL RD., YAPHANK, NY 11980

TRS-80 USERS GROUP OF CENTRAL NEW YORK, 2362 EAST LAKE ROAD, SKANEATELES, NY 13152
U.A.U.G., C/O UPSTATE COMPUTER SHOP, 99 COMMERCIAL DR. 5A, WHITESBORO, NY 13492

UPSTATE 994A USERS GROUP, PO BOX 13522, ALBANY, NY 12212
VAN RENSSALAER COMPUTER USER GROUP, ST. ANTHONY ONHDUSON, WASHINGTON AVE., RENSSALAER, NY 12144

WESTCHESTER FAIRFIELD AMATEUR COMPUTER SOCIETY, R.R. 1, BOX 176, POUND RIDGE, NY 10576
WESTCHESTER PET USER GROUP, PO BOX 1280, WHITE PLAINS, NY 10602

NORTH CAROLINA

ACUSOFT ATARI COMPUTER USERS SOCIETY OF FAYETTEVILLE, PO BOX 1117, FAYETTEVILLE, NC 28302
APPLE CLUB OF FAYETTEVILLE, PO BOX 70, FAYETTEVILLE, NC 2802

CAPE FEAR COMPUTER AND HEATH USER'S GROUP, 2454 VANDEMERE AVENUE, FAYETTEVILLE, NC 28304
CAROLINA APPLE CORE, PO BOX 31424, RALEIGH, NC 27622

CHARLOTTE 994A USERS, 2637 CONNEMARA DR., MATTHEWS, NC 28105
CHARLOTTE 994A USERS, 2637 CONNEMARA DR., MATTHEWS, NC 28105

GENS, GREENSBORO EIGHTY MICROCOMPUTER SOCIETY, PO BOX 10014, GREENSBORO, NC 27404
GUILFORD 99ER USERS GROUP, (TI 994A), PO BOX 21691, GREENSBORO, NC 27420

MICRO COMPUTER USERS CLUB, RT. 1 BOX 134-A, BOONVILLE, NC 27011
MICRO COMPUTER USERS GROUP OF RALEIGH, 5225 N. BOULEVARD, RALEIGH, NC 27604

NATAHALA COMPUTER CLUB (99ERS), RT. 3, BOX 64-E, ROBINSVILLE, NC 28771
NATIONAL COMPUTER SOCIETY, PO BOX 41205, FAYETTEVILLE, NC 28304-0007

NATIONAL SOCIETY OF MICROCOMPUTER USERS AND GROUPS, PO BOX 8084, GREENVILLE, NC 27834
PIEDMONT TRIAD ATARI USERS GROUP, 6104 KNIGHT ROAD, GREENSBORO, NC 27410

RALEIGH COLOR COMPUTER CLUB, PO BOX 681, GARNER, NC 27529 C/O DAVID ROPER
RALEIGH OSBORNE COMPUTER CLUB, PO BOX 53754, FAYETTEVILLE, NC 28305

TACC, POB 17523, RALEIGH, NC 27619
TACS, PO BOX 7073, GREENSBORO, NC 27417-0073
TIMEX USERS GROUP, RT. 3 BOX 64E, ROBINSVILLE, NC 28771

TRIAD AMATEUR COMPUTER SOCIETY, PO BOX 7073, GREENSBORO, NC 27417
WILMINGTON TRS-80 USERS GROUP, 1605 PRINCESS ST., WILMINGTON, NC 28401

WILSON TRS-80 USERS' GROUP, PO BOX 336, LUCAMA, NC 27851

NORTH DAKOTA

BASE COMPUTER HOBBYISTS GROUP, C/O 101-1 AVION WAY, MINOT AFB, ND 58704
M.A.D. H.U.G. 994A, DENNIS SCHJELDAHL, 509 REEVES DRIVE, GRAND FORKS, ND 58201

TRS-80 COLOR COMPUTER CLUB, PO BOX 218, MINOT, ND 58701

OHIO

ACE (ATARI UG OF COL.), 6632 LISAMARIE RD., COLUMBUS, OH 43229, C/O ED BILL ECKERT
AD A STAR (ATARI MICROCPU NET), C/O JACK MCKIRGAN 2 WDB8NG, 4749 SR 207 NE WASHINGTON C.H., OH 43160

AIM-65 USER'S GROUP, C/O DONALD CLEM, RR #2, SPENCERVILLE, OH 45887
AMATEUR COMPUTER SOCIETY OF CENTRAL OHIO (ACSCO), PO BOX 28355, COLUMBUS, OH 43228-0355

APPLE SIDERS, C/O DAN MCKEE, 5001 RELLEUM AVE., CINCINNATI, OH 45238
APPLE-DAYTON USERS GROUP, POB 1666, FAIRBORN, OH 45324

ATARI USERS GROUP, 6895 N. HIGH ST., WORTHINGTON, OH
BUCKEYE 99ers, 2424 MANSFIELD-LUCAS RD., MANSFIELD, OH 44903

CCC (RS COLOR CPU), PO BOX 478, CANFIELD, OH 44406-0478, C/O ED GINNY KOMARA
CENTRAL OHIO ADAM USERS GROUP, 730 THURBER DR. APT. N, COLUMBUS, OH 43215

CENTRAL OHIO COMMODORE USERS GROUP, 107 S. WESTMOOR AVE., COLUMBUS, OH 43204
CENTRAL OHIO 99ers, 1456 GRANDVIEW AVE., COLUMBUS, OH 43212

CIN DAY USERS GROUP, PO BOX 519, WESTCHESTER, OH 45069
CIN-DAY TI USER GROUP, PO BOX 519, WEST CHESTER, OH 45069-0519

CINCINNATI COMP CLUB, 6515 KENVIEW DR., CINCINNATI, OH 45243
CINCINNATI COMPUTER CLUB, 1@@ CONVERSE DRIVE, CINCINNATI, OH 45240

CINCINNATI TRS-80 USERS GROUP, 5380 BAHAMA TERRACE, APT. 8, CINCINNATI, OH 45233
CINCINNATI TRS-80 USERS GROUP, 3211 MARYLAND AVE., CINCINNATI, OH 45204

CINTUG, PO BOX 399145, CINCINNATI, OH 45239 (513) 742-BYTE
CINTUG (Cincinnati TRS Users Group), C/O LEE PENN, 6798 WEATHERIDGE DR., CINCINNATI, OH 45230

CLEVELAND DIGITAL GRP, PO BOX 17440, CLEVELAND, OH 44117
COACH (APPLE UG) OF COLUMBUS, C/O JAY WRIGHT, 1887 WILLOWAY CIRCLE N., COLUMBUS, OH 43220

COGNHEELS CINCINNATI OSBORNE GROUP, 6404 COFFEY ST., CINCINNATI, OH 45230
COKUG, CENTRAL OHIO KAYPRO USERS GROUP, 385 WEST MAINS TREET, WESTERVILLE, OH 43081, C/O JOE BAXTER OR JIM DAVIS

COLOR COMPUTER CLUB, PO BOX 478, CANFIELD, OH 44406
COLUMBUS CPM-ACSCO USERS, BOX 28355, COLUMBUS, OH 43228-0355

COLUMBUS MAXRO USERS, (M.A.X.U.G.), BOX 28355, COLUMBUS, OH 43228-0355
COLUMBUS TRS-80 COLOR COMPUTER USERS, C/O GARY DAVIS, 2153 LEAH LN., REYNOLDSBURG, OH 43068

COLUMBUS VIC-20 USERS GROUP, 169 N. VINE, WESTERVILLE, OH 43081, C/O LEN HOLLAND
COOUG, CENTRAL OHIO OSBORNE USERS GROUP, DEVRY INST., 1350 ALUM CREEK DRIVE, COLUMBUS, OH 43209

C/O DALE BROWN
CUYAHOGA VALLEY COMPUTER CLUB, C/O BRIAN HEIN, 3053 ROHRER RD., WADSWORTH, OH 44281

DAY-ATARI, 1461 HUFFMAN AVE., DAYTON, OH 45403
DAYTON MICROCOMPUTER, 2629 RIDGE AVE., DAYTON, OH 45414

DAYTONIAN COMMODORE TELE-COMPUTE USERS GROUP, PO BOX 24443, DAYTON, OH 45424
DELAWARE OHIO VIC-20 USERS GROUP, PO BOX 216, NEW ALBANY, OH 43054, C/O TOM MARTIN 855-2404

ENGLEWOOD COMPUTER USERS GROUP, 313 CANDY LANE, UNION, OH 45322 (513) 836-3273
GOODYEAR COMPUTER CLUB, GOODYEAR TIRE CO., AKRON, OH 43316

HEO APPLE CORP., BOB CALDWELL, 10112 RIDGEWOOD DR., TWINSBURG, OH 44087
LIMA AREA TI 994A USERS GROUP, 1513 WEST WAYNE STREET, LIMA, OH 45805

NEO APPLE CORPS, C/O NORM HENKE, 21750 MILLER AVE., EUCLID, OH 44119
NEW HORIZONS, WILLIAM SAGER, 612 MEADOW SPRING, MAUMEE, OH 43537

NORTHEAST OHIO COMMODORE USERS GROUP, 5104 MAYFIELD DR., LYNDDURST, OH 44124
OH-M-TI, DON WOLLENBECKER, 1522 RESWICK, OREGON, OH 43616

OSBORNE USERS OF COL., OHIO INST. OF TECH, 1350 ALUM CREEK DR., COLUMBUS, OH 43209, C/O BILL HOOKER/DALE BROWN
OSI, NORTH COAST USER'S GROUP, 30600 NAMAHASSET RD., BAY VILLAGE, OH 44140

ROBOTICS USERS GROUP, APRIL LANE, COL., OH

RUBBER APPLE USERS GROUP, ROBERT M. NEBIKER, 1870 BROOKFIELD DRIVE, AKRON, OH 44313
SAUCE, STARK APPLE USERS COOPERATIVE EXCHANGE, PO BOX 35091, CANTON, OH 44735

SCREAMING EAGLES, C/O DAVID YAROS, 1006 2ND NAT'L BLDG., CINCINNATI, OH 45202
SOUTHEASTERN OHIO COMPUTER SOCIETY, C/O DON SARGENT, PO BOX 1215, CAMBRIDGE, OH 43725

THE LAKE ASHTABULA IBM PC USERS GROUP, PO BOX 175, MADISON, OH 44057
THE PSYCHOLOGICAL — COMPUTER — CLUB, 2118 FOREST LAKE DRIVE, CINCINNATI, OH 45244

TIMEX/SINCLAIR USERS GROUP, 4255 S. HAMILTON, COL., OH
TRI-STATE OSI USERS, C/O TED MORRIS, 6306 KINCAID RD., CINCINNATI, OH 45213

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DALLAS-AGGIE COMMODORE 64 CLUB, 2914 POPLAR TRAIL, GARLAND, TX 75042, (214) 494-083

TMS**Continued from page 120**

zero when a character is written to the transmit buffer register.

Bit 21: Receive Buffer Register Loaded. When set, indicates that a complete character has been assembled in the receive buffer register. It is cleared by an output to bit 18 (RIENB).

Bit 20: Data Set Status Change Interrupt. Set when either DSR or CTS changes state and the Data Set Status Interrupt has been enabled.

Bit 19: Timer Interrupt. Set when the timer has elapsed and the Timer Interrupt has been enabled.

Bit 17: Transmitter Interrupt. Set when the Transmit buffer register is empty and the Transmitter Interrupt has been enabled.

Bit 16: Receive Interrupt. Set when the Receive Buffer register is loaded and the receive interrupt has been enabled.

Bit 15: Receive Input. The logic level of the RIN line at the time that the input was

sampled.

Bit 14: Receive Start Bit Detect. Set during transition of the first bit of a word. Normally not used.

Bit 13: Receive Full Bit Detect. Set when the first bit of the character (excluding the start bit) is received, and is cleared when the character is completed. Not normally used.

Bit 12: Receive Framing Error. Set when the stop bit of the received character is a logic zero (should be a logic one), indicating a transmission error.

Reset when a character with a correct stop bit is received. It is recommended that this bit only be sampled when RBRL is set.

Bit 11: Receive Overrun Error. Set when another character is being assembled in the 9902 and the previous character has not been acquired from the 9902 by the software and the RBRL flag reset.

Bit 10: Receive Parity Error. Set when the parity of the incoming character is incorrect,

indicating transmission error. Reset when a character with correct parity is processed.

Bit 9: Receive Error. Set when RFER, ROVER or RPER is set.

Bits 7-0: Receive Buffer Register. This is the register where the received character is stored. For data lengths shorter than eight bits the data is right-justified in the register.

Next Month: The output bits, programming the 9902 and some examples of code that uses the 9902.

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TIMEX-SINCLAIR

Timex/Sinclair Survival Column

by Mark L. Fendrick

The scene shows a small room filled with computer equipment. An unattended computer is shown dialing all telephone numbers in a California exchange. Those numbers which are answered by a computer carrier signal are noted by the computer for review by its human user at a future time. A high school age young man, trying those numbers reaches what he thinks is the computer of a company engaged in developing computer games, and proceeds to bypass its security, and chooses a "game" from the menu. Unknowingly, he has dialed not the computer game company, but the computer at the United States Defense Department command center. Instead of just playing a game, he has sent the entire United States defense system into a major alert.

A purely fictional situation, which could not be accomplished with any Sinclair computer, right? Well, yess and no. While it is a stretch of the imagination to suppose that a home computer user can, even inadvertently, tap into the U.S. Defense Department computer system, your computer can communicate with other computers by way of your telephone. This is ac-

complished by way of a device called a Modulator/ Demodulator Modem. A Modem is a device which allows your computer to exchange information with other computers using everyday telephone lines. It takes the information from one computer, and translates (MODulates) it into a signal to be sent over the telephone lines. It must also take the modulated signal from the telephone lines. It must also take the modulated signal from the telephone line, which has been sent by a computer at a different location, and translate (DEMODulate) it back into a form which your computer can understand. Hence the name, MODEM.

When Timex first announced the T/S 2068, one of the earliest peripherals announced was the T/S 2050 Telecommunications Device (Modem) to be sold, with all necessary software, for a suggested retail of \$119.95. The issue of RAMBLINGS which reached Timex owners in late October announced the availability of the device, and an order form was included. However, those who ordered immediately, and looked forward to reaching new computer productivity were soon disappointed. First, in January, a letter dated ear-

ly December said that there was a delay in delivery, and the modems would not be delivered within the original time frame. Further calls to the 800 number, produced conflicting information, with conflicting delivery dates. When Timex made the announcement that they were leaving the computer market, the 800 number still insisted that the modem would be delivered to those who had already placed orders. As late as March, delivery was still assured. In the end, however, Timex announced that no modems would be delivered. After many months of anticipation, many potential customers were again let down.

Looking through the ads, there was still one alternative. The Byte-Back Co. (Rt. 3, Box 147, Brodie Road, Leesville, S.C. 29070; (803)532-5812, who had been selling a modem for the T/S 1000, was advertising that it was adaptable to the T/S 2068. Upon calling Byte-Back, I found that they were selling a new modem, designated the MD-68. This modem is functional on both the T/S 1000 (ZX-81 & T/S 1500) and the 2068. The telecomputing software has the following features; send and receive programs by phone; copy information from a host

computer (such as CompuServe, Source, etc.); print it; review it; save it on tape; send from memory; operate in originate, or answer mode; use Timex 2040 or any RS-232 printer; RS-232 printer port provided; no extra memory required, but with 64K memory you can store up to 60 full screens. (I hope to have a chance to review this software in the near future.) This modem is sold in two ways. If you are experienced at kit building, you may order it as a do-it-yourself project for \$119.95. If you would like to get your modem assembled and tested, the price is \$149.95. Two free hours on CompuServe is included with the MD-68.

What about the modem that was originally designed for Timex? That modem was to be manufactured by Westridge Communications, Inc. in Marina DelRey, California, the manufacturers of the Anchor modems. After the withdrawal of Timex from the market, Westridge removed the Timex/Sinclair name, and

replaced it with their own, and the Westridge 2050 modem appeared. The list price is the same \$119.95 that Timex had announced, and includes the Smart Terminal I software. The modem measures 7½" x 6" x 1½" and is the same silver-grey color that the T/S 2068 is. This modem is compatible with all Sinclair Computers from the Sinclair ZX-81 to the Timex/Sinclair 2068. No additional interface is required, as the TS 2050 attaches directly to the expansion port at the back of your computer.

Included with your purchase is everything you need to get started using your modem. Aside from the unit itself, you get the modem power supply, a cassette containing the MTERM/T software. Side one contains the T/S 2068 version, while the other side has the

Continued on page 126

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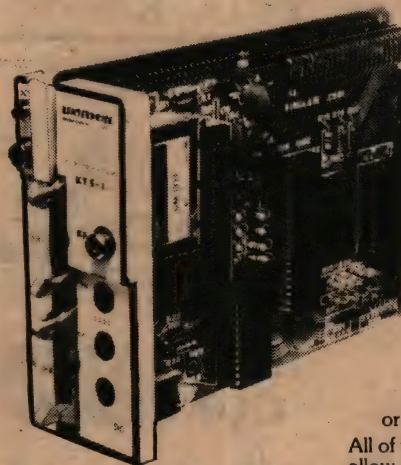
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All of the software is included and is located in sockets on the Board. Dip switches allow manual selection of the operating system, and duplicated 2K RAM allows both sets of points to be maintained. ASZMIC & SP BASIC were developed by Chris Frazer-Johnson of Comprosys Ltd. Documentation is included. TEACH YOURSELF ASSEMBLY LANGUAGE PROGRAMMING, with ASZMIC AND SP BASIC, one of the finest self teaching tools available.

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Sinclair
Continued from page 125

software for the Sinclair ZX-81, T/S 1000 & T/S 1500. The manual is simple enough for the total novice, and if you have never "telecomputed" before, you will have no problem getting started. It is not, however, without its faults. I

noticed a couple of obvious errors on some of the lists, such as the control characters, and the ASCII listings. In general, though, most technical terms are explained right away, and the majority of the text is straightforward, avoiding technical terms where possible. The final piece of the package

is an envelope containing a great offer from the SOURCE. (For more information on THE SOURCE, see Rich Fields' article on the networks in the June issue of COMPUTER SHOPPER.) Ordinarily the initial registration fee is \$100.00, but with your modem, this fee is waived, and you may register via an 800 number and receive your ID# and password immediately. (My SOURCE ID# is BCA632 and you may send messages to me through THE SOURCE, and I will respond in a like manner. Use MAIL S at the command level to send your message.) You may then start using this service as soon as you connect your modem.

The TS 2050 modem is a direct connect type which connects directly to the telephone wiring by way of the standard modular plug. (The other type is the acoustic modem on which you must place the handset of a telephone to connect.) It transmits at a speed of 300 Baud (approximately 300 words per minute). To set up

your modem, you connect the edge socket (at the end of a flat 12 inch cable) to the expansion bus on your computer. The T/S 2040 printer may be attached directly to this for use in printing screens received via your modem. The telephone jack plug is located at the end of a six foot cable and connects to the jack where your telephone is currently connected. (If you don't have one of the new modular connectors, the manual gives advice on how to connect to your equipment.) You disconnect your telephone, attach the modem, and reconnect your telephone to the modular connection at the back of your modem. Next you attach the modem's power supply and turn on your computer. Finally you load the proper terminal software into your computer, and you are set, almost.

In order for computers to communicate with each other, they have to talk the same language. In talking over the telephone, certain conventions have to be agreed upon

beforehand. The manual very clearly explains the meaning of these parameters, and how to set them. The program starts with these parameters set at the most common settings, as these are the settings used by the major services (SOURCE, COMPUSERVE, DOW JONES, MCI, and most bulletin boards). The four parameters that you can set are as follows:

1) DUPLEX - This may be set at either full or half duplex. In half duplex, your computer displays the characters on your screen as you type them. Full duplex does not display these characters from your keyboard, but rather the echo received from the other computer of the characters you are transmitting. If you set your duplex setting to half when it should be at full, you will see HHEELLOO when you type the word HELLO, and if you set it at full when it should be at half, you will not see what you are typing at all!

2) PARITY - This is a method used by some computers to determine if there are any errors in the transmission. It counts the total number of bits transmitted for each

Continued on page 128

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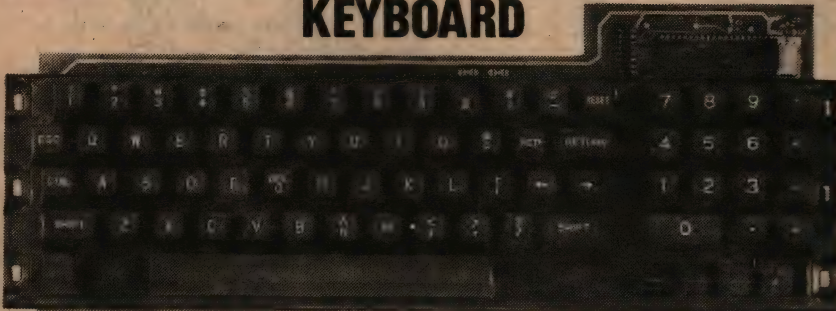
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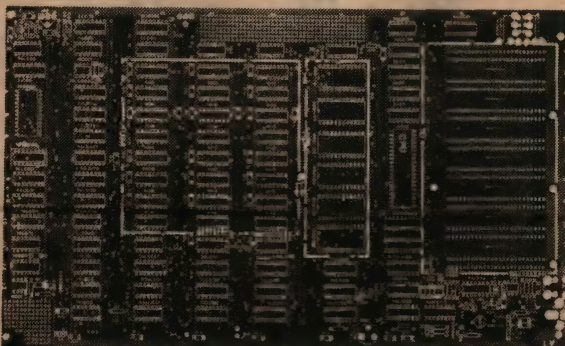
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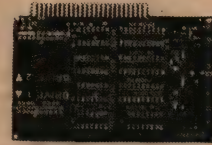
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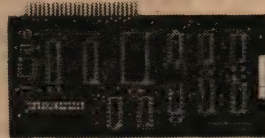
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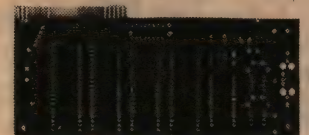
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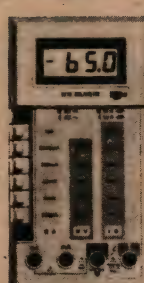
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Sinclair

Continued from page 126

character, and compares it to the parity type set. If you have set even parity, the length of each character must be an even number of bits. For odd parity, the length must be an odd number. If the transmission is incorrect, it is not accepted, and is retransmitted. (This is done by the computer, and requires no action on your part.) If the computer does not require parity, this gets set to; None. Even parity is the most common.

3) WORD SIZE - This determines the number of bits to make up each character to be sent. You can set any length from 5 bits to 8 bits. Seven bits is the most common.

4) STOP BITS - In order to keep both computers synchronized in their transmissions, some computers re-

quire that blank bits sent after each character. You can set your computer to send either one or two such blank bits.

Be sure to check with the operator of the computer you are calling to determine how to set these parameters.

These parameters can be set from the menu by pressing the "S" key. Pressing "D" changes the duplex setting, "W" changes the word length, "S" sets the stop bits, and "P" sets the parity. When you have set the parameters to meet your needs, pressing ENTER

returns you to the main menu. If you are using a T/S 2068, you may set the BORDER, PAPER, and INK colors by pressing the appropriate keys at the main menu. Now you are ready to call another computer.

By pressing "A" at the main menu, you are prompted - A: NUMBER OR (X)? You enter the number from your keyboard, and press ENTER. You will hear a pulsing sound from your modem; it is dialing the number. (If you are dialing from a system that requires a pause to wait for a second

dialtone, enter a "P" - for pause between the proper numbers.) If the number does not answer or is busy, you will be informed, and asked to enter a number or "X" again. Entering "X" causes your modem to hang up. If you are connected, you will be informed, and automatically be placed in terminal mode. It is in this mode that you can communicate. At this point you will have to follow the sign on and procedural instructions of the computer you are going to communicate with.

You may be required to use

CONTROL CHARACTERS to perform certain tasks online, and you will notice that your computer does not have a CONTROL (or CTRL) key. This shortcoming is rectified by pressing SHIFT and 7 followed by the character you wish to send as a CONTROL. (A full list of CONTROL CODES is shown in your modem's manual. If you own a ZX-81, T/S 1000, or 1500, then you may also type a number of characters that your keyboard

Continued on page 129

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Sinclair

Continued from page 128

does not have. These include: !# & and others. This list too is included in the manual.

Two CONTROL characters that you will find very useful are CTRL-S and CTRL-Q (sometimes referred to as XON and XOFF protocol). This

serves to tell the remote computer to stop (CTRL-S) or continue (CTRL-Q) sending data. You will use these control codes to stop the scrolling so you can read what is being sent, and/or to copy it on your printer. To accomplish this press CTRL-8 (SHIFT-7 then 8) and you will see (C)lear (M)enu (P)rint (ENTER) at the bottom of

your screen. (Pressing "C" will clear the screen, "M" will display the MAIN MENU). Pressing "P" will cause a COPY command to be sent, copying the current screen.

Your modem also has the ability to answer the telephone automatically if your computer is on and the terminal software is running. (The manual incorrectly titled the chapter dealing with this as AUTO DIAL instead of AUTO ANSWER.) This allows another computer to call yours and leave a message of up to one screen in length.

You will find that most computers send their text as 80 character lines, and you will have to get used to reading words that have wrapped around to the next line. (MCI allows you to specify your own line length, but right now their minimum is a 39 character line.)

Right now this modem can be ordered from E. Arthur Brown Co. (3404 Pawnee Drive, Alexandria, MN 56308 612-762-8847), and Curry Computer (5344 West Banff Ln., Glendale, AZ 85305 602-978-2902). If you are a

dealer, let me know. Anytime you order from or contact any dealer listed here, be sure to mention **COMPUTER SHOPPER**.

There are a number of networks you can communicate with via your modem, and Rich Fields covered them well in his article. I would like to mention a service that he did not cover, that you can sign up with for free. I am referring to MCI MAIL. MCI MAIL is an online service that allows you to send letters to anybody, whether or not they have a terminal, or are even a member

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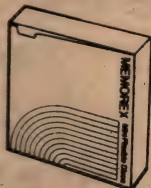
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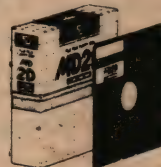
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Continued on page 130

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Continued from page 129

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four hour service (\$25.00) in which your mail is delivered by courier. How about Telex service? MCI gives you access to Telex sending facilities, as well as your own Telex address to receive Telexes which are delivered to you when you sign on to check your mail. You only are charged for mail you send, and not for any you receive. For more information, and to register call 1-800-MCI-2255.

By the way, if you remember, in my first column I reported that I was advised by Timex that the SCRABBLE software written for the ZX-SPECTRUM was compatible with the T/S 2068? I managed to obtain a copy, and found that it is in machine code and will NOT run on a T/S 2068. -----

Thanks for your letters. By your comments I can see that we are very strongly supportive of each other, and want to see our computers survive.

Don't forget, you may contact me in care of COMPUTER SHOPPER, via THE SOURCE (ID# BCA632) or MCI MAIL (To: Mark Fendrick). Let me know of any happenings regarding the Sinclair community. We've got to stick together. ●

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Only occasionally do I find a program that I can recommend highly. In terms of price, usefulness, and ease of operation, InfoScan is one such product. It allows you to organize, store, sort, and recall any free-form information you wish. Essentially it turns your computer into an electronic notebook.

I purchased InfoScan out of curiosity. I had just finished reviewing another well-known electronic notebook program, which I found relatively useless for the purposes I had in mind. I decided to try one more commercial product before writing my own filing utility, and InfoScan's low price attracted my attention. This program is proof that useful software need not cost hundreds of dollars.

When you run InfoScan, you are presented with a screen divided into four windows (see Figure 1). The upper-left portion of the screen merely holds the program title. The upper-right contains information about the file you are running, the record you are working

with, and whichever InfoScan function you are using.

The lower-right window is a menu with six functions: FILE, SCAN, ADD, DELETE, CHANGE, END. You select a function by moving a blinking cursor up and down the window with the arrow keys, and pressing <ENTER> when the cursor is in front of the appropriate choice.

The largest window is in the lower-left corner of the screen, and contains at various times system prompts, a sorted list of records in the file, or the text of a "narrow" record (more about that later).

A session with InfoScan begins when you select the FILE function from the main menu and name a disk file. InfoScan maintains two distinct disk files for each information file that you use. The first, which has an extension of /KWF, is a list of records in the file and other pertinent information. The second, with an extension of /DAT, contains the actual information that you type in. You don't need to be concerned with the file extensions; InfoScan will add them automatically to the file name you specify.

If InfoScan does not find the file on your disks, it will ask you if you wish to create a new file. Assuming that you answer

yes, the program will ask if you want to keep the data file and keyword file on the same disk. Next, InfoScan will create the files to your specifications.

Once you have named a file, the blinking cursor returns to the function menu. You may now choose to SCAN the records in the file, ADD new records, DELETE a record, or CHANGE a record. No matter which function you choose, the text window on the lower right clears and shows you a sorted list of records in the file. If the list is longer than the window, the arrow keys will scroll it up and down.

To scan, delete, or change a record, you merely need to use the arrow keys to move the list up or down until its name is between two brackets on the screen. Then you press the <CLEAR> key to begin processing that record. You can also use a search function to find any particular record, though I find that even with files containing nearly a hundred records, the arrow keys scroll the list fast enough that I don't usually need to use the search.

When you wish to ADD a

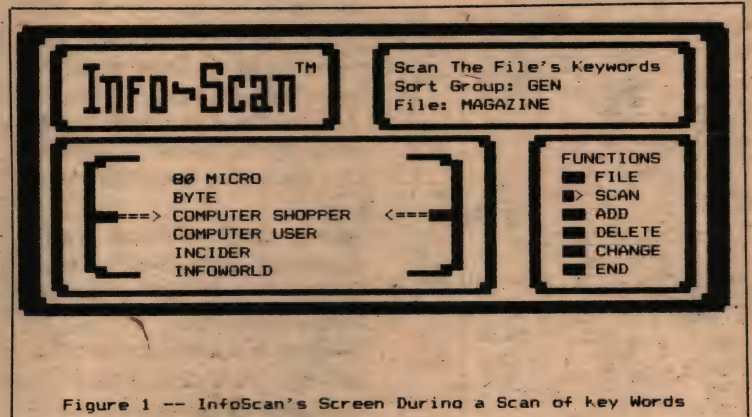


Figure 1 -- InfoScan's Screen During a Scan of Key Words

record to the file, you are asked for the record name (which can be up to 17 characters long), an optional "Sort Group," and whether the record should be formatted for a full screen (58 characters wide) or narrow screen (36 characters). If you choose a wide-character record, the screen clears and you are given a new, bordered screen to type in. If you choose a narrow record, the lower-left window clears for text entry. In either case, you may enter approximately 2000 characters of text (34 lines in wide mode, 56 lines in narrow mode). In either case, everything from the start of the screen to the last line you

type in is saved on disk when you have finished entering the information for the record.

InfoScan's text editor isn't great, but it is sufficient for the job. It includes word wraparound, so that words are never broken between one line and the next, as well as the ability to insert or delete entire lines. It does not, however, include character or word delete functions, nor any way to insert a character into an already-typed line. You can design a standard form which will appear on the screen when you begin entering information

Continued on page 132

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InfoScan

Continued from page 131

for a new record. Using the form, you can move from field to field with the <ENTER> key, adding information as you go.

When you are finished entering your information into a record, you press <SHIFT><CLEAR> to return to the original window display. You can then add another record or press <ENTER> to return to the main menu. In either case, the keyword you designated for a new record will appear in the sorted list in the lower-left window. The other choices in the main menu --

SCAN, CHANGE, DELETE, and END -- are self-explanatory. You can also change the name of a record at any time, print the record currently displayed at any time, and print the entire keyword list.

InfoScan has three shortcomings that I have found irksome but easy to work around. First, as I said before, the text editor does not have any facility for inserting or deleting characters or words. You can type over text whenever you are in the CHANGE or ADD mode; if you need to insert a word, you have to retype an entire line.

Second, InfoScan uses <@> as a control key, just as Scripsit does. However, InfoScan requires that you type <@>, release it, and then type another key, while Scripsit requires you to hold down the <@> key while pressing another command key. The change would not be difficult to adjust to except for another InfoScan quirk. If you press <@> twice in the ADD mode, or hold it down long enough to begin repeating, the current record is erased and you are

returned to the main menu. I accidentally erased several records before I got used to InfoScan's use of the <@> key. However, if you haven't used Scripsit, you will not be bothered by this problem.

InfoScan's third weakness is that it can only print the currently-displayed record, and automatically advances the paper to a new page after doing so. I had a need to keep over a hundred short records in an InfoScan file, and then print them continuously. In order to keep from printing over a hundred pages, I had to write my own program to pull information from InfoScan's files (it was a relatively easy job).

When I talked to InfoScan's developer at The Small System Center, he said that all three of these problems would be resolved in a next version of InfoScan, which should be available soon.

In its present form (Version 2.7), InfoScan is a very good product. With those changes made, it will be excellent. It is certainly the best "electronic notebook" available for TRS-80 computers, and will work with all popular DOSs.

Postcard Writer

by Richard Burckhardt

Introduction

Postcard Writer came about as a result of my involvement in a number of clubs and organizations. I am the secretary of some of these and find myself sending out numerous reminders of meetings, programs, and membership expirations, along with a multitude of general announcements.

Since postcards are easier to handle and a lot cheaper than letters, I wanted to find a way to produce these easily and inexpensively.

My first solution was to get one of those big rubber stamp kits with removable letters so that you can create your own messages. This worked pretty good, but was slow, very messy, and still left me with

the chore of stamping return addresses on up to 200 cards! Surely there was an easier way!

Early attempts at using word processing software to produce a lot of cards were equally frustrating. Resetting the top of form and page width tended to be a tedious chore. It wasn't hopeless, but was just too much work for me to want to go through for something as simple as a postcard. Word processors just weren't intended for something as short as a card. It seemed that the old adage "If you want it done

right, do it yourself" was correct. Postcard Writer was born.

The program was written on a single-drive Model 3 with 48k of memory, but it should run on any system. I tried my best to keep the BASIC as basic as possible. This made the program a little longer than necessary, but I felt that it was worth it to make the program as universal as possible. The only problem that I see is with

Continued on page 133

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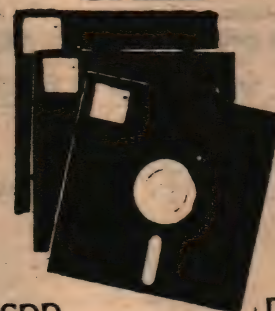
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Infoscan

Continued from page 132

the screen format. Lines 1-7 will probably have to be deleted on systems other than the Model 3 since these lines use screen formats peculiar to the Model 3. The "PRINT@" in line 10 will probably need to be changed to a "PRINTTAB" because of this same formatting. Everything else should work. Color Computer users might be a little confused by the broken lines since the program assumes a screen at least 50 characters wide and Coco screens are only 32 characters.

The Program

Line 1 clears sufficient string space for the topic line, headline, and text of the card. After the program is run and the menu is displayed, you have the option of printing postcards, return address, or individual mailing addresses on

the postcards. You may also run a mailing list or exit to BASIC or DOS.

Option 1 will allow you to enter a topic line, a headline, and up to 12 lines of text 50 characters long. The topic line and the text of the card are printed in normal print while the headline will be in double-sized print on the Epson MX-80. If you are using another printer, you may have to change the CHR\$ codes in lines 330 and 331. If you have a daisy wheel or a printer that doesn't allow double-sized characters, change line 330 to LPRINTTAB((50-T2))HL\$ and delete line 331 entirely. This will print the headline in regular type.

After you enter the topic line and the headline, you are asked how many characters are in each. This is to provide the variables T and T2 for the automatic centering routines in lines 320 and 330. These work best when the numbers are

even, so you might want to add a period or exclamation mark to even out the line.

You are then asked to input the text for the postcard one line at a time. Each line corresponds to a string variable, A\$-L\$, so commas, colons, and semicolons can't be used, but there are ways to get around them using dots, dashes and just blank spaces. If you want to leave a line blank, just hit <ENTER>. However, if you have already run a postcard and that particular line had some text in it, the text will still be in that string, so you might want to get into the habit of hitting the <SPACEBAR> once or twice just to clear the string.

After you have finished entering the text, it is printed on the screen and you are asked if it is correct. If you see an error or want to change a line, answer "N" and you will be asked which line you want to change. Re-enter the line, hit

<ENTER> and you are asked again if the text is correct. If you are satisfied, answer "Y" and you are ready to print the cards. Answer the "How many cards are to be printed" prompt with any number, hit the <ENTER> key, and you are told to align the tractor feed cards in the printer and hit the <SPACEBAR> to start printing. The program is formatted to use 4x6 continuous cards that are available at most office and computer supply companies. At the conclusion of the printing, you are taken back to the Menu.

Option 2 allows you to print your return address on the postcards. On selecting this option, you are told to turn the cards over in the printer if you have already printed text on one side. You are then asked to input the name, address, city, state, and zip code. The return address is printed on the screen and you are asked if it is correct. If there are errors, you are

asked to input the information again. When everything is correct, you are asked how many cards are to be printed. After you input the number, you are told to position the card in the printer and to hit the <SPACEBAR> to begin the printing. At the conclusion, you are once again sent back to the Main Menu.

Option 3 allows the user to input individual names and addresses to be printed on cards. Option 3 is also useful if you are only sending a few cards for reminders about meetings, etc. For longer lists, mailing list software that supports the standard peel and

stick labels would be appropriate. If you're real ambitious, you can alter the TABs and LPRINT lines in a BASIC mailing list program so that it prints the addresses on postcards instead of labels. I did this with a program called Discmail by Merle Sly of Crosswell, Michigan. It is a perfect supplement to Postcard Writer when adapted.

After you input the address, you are taken through the same error correction routine as in the return address section above. The printing routine is also identical, except that after each address is printed, you are asked if you would like to address additional cards. If you answer "Y", you are sent through the input routine again. "N" will take you back to the Main Menu.

Option 4 exists Postcard Writer and runs your mailing list program so that you can print labels or, if you have reset the tabs in your mailing list program, you can print the addresses right on the postcards. Because there are so many mailing list programs around, I can only tell you that you will have to experiment a bit until you get the line spacing and tabs the way you want them.

Before you can run your mailing list, however, you must change line 4000. Take out "Discmail/BAS" and put in the name of your BASIC mailing list program.

When you are finished, options 5 and 6 allow you to exit to DOS or to BASIC. If you exit to BASIC, the program will still be in memory, so remember to type NEW before loading an additional program.

Postcard Writer offers a multitude of uses. Advertisements, rate cards, general announcements, or just about anything that requires communication with a number of people for a low price is within the scope of this program. The best thing about it, next to price, is that it's easy to use and neat. Enjoy! ●

```

1 CLEAR1000:ER$=STRING$(63,32):T$=CHR$(34):GOTO5
2 Y$=INKEY$:IFY$=""THENZ$=RETURN
3 GOSUB2:RETURN
4 FOR I = 1 TO 5: SET (X,Y): SET (X,U): NEXT I: FOR Y=T TO U: SET (X,Y): SET (S,Y): NEXT Y: RETURN
5 CLS: PRINT@209, S: S=123: T=0: U=47: R=0: GOSUB 4
6 PRINT@210,CHR$(23)*"POSTCARD WRITER":PRINT@414,"by":PRINT@454,"Richard Burckhardt":PRINT@596," (c) 1984"
7 FOR I=1 TO 2000: NEXT I
10 CLS:PRINT@157,"MENU":PRINTTAB(20)*"1) PRINT POSTCARDS"
20 PRINTTAB(20)*"2) PRINT RETURN ADDRESS ON CARDS"
21 PRINTTAB(20)*"3) ADDRESS INDIVIDUAL CARDS"
22 PRINTTAB(20)*"4) RUN MAILING LIST"
23 PRINTTAB(20)*"5) QUIT - EXIT TO BASIC"
24 PRINTTAB(20)*"6) QUIT - EXIT TO DOS:PRINTTAB(23)*"CHOOSE 1 TO 6"
25 INPUT C
30 IF C=6 GOTO 10: IF C=1 GOTO 10
40 IF C=1 CLS: GOTO 64
50 IF C=2 GOTO 1000
60 IF C=3 GOTO 3010
81 IF C=4 CLS:GOTO 4000
82 IF C=5 CLS: END
83 IF C=6 CLS:CMD$=""
84 CLS:REM ROUTINE TO INPUT TOPIC LINE AND HEADLINE
85 PRINT:PRINTTAB(7)*"WHAT IS THE TOPIC LINE TO SAY (42 CHARACTERS MAX.)"
86 PRINTTAB(10)*"-----"
89 PRINT(9):INPUT T$
90 PRINT:PRINT"HOW MANY CHARACTERS ARE IN THIS LINE (INCLUDE SPACES)":INPUT T
90 CLS
100 PRINT:PRINT"WHAT WILL THE DOUBLE-SIZED HEADLINE SAY (24 CHARACTER MAX.)"
110 PRINTTAB(18)*"-----"
120 PRINTTAB(17):INPUT HL$
124 PRINT:PRINT"HOW MANY CHARACTERS (INCLUDING SPACES) ARE IN THE HEADLINE"
125 INPUT T2
130 CLS:REM ROUTINE TO ENTER TEXT OF POSTCARD
140 PRINT:PRINT"ENTER THE TEXT OF YOUR CARD ONE LINE AT A TIME (50 CHAR. MAX.)"
145 PRINT"DO NOT USE COMMAS, COLONS, OR SEMICOLONS."
150 PRINT"YOU MAY USE UP TO 12 LINES. PRESS (ENTER) AFTER EACH LINE."
160 PRINTTAB(11)*"-----"
170 PRINT"LINE 1:"INPUT A$
180 PRINT"LINE 2:"INPUT B$
190 PRINT"LINE 3:"INPUT C$
200 PRINT"LINE 4:"INPUT D$
210 PRINT"LINE 5:"INPUT E$
220 PRINT"LINE 6:"INPUT F$
225 CLS:PRINTTAB(11)*"-----"
230 PRINT"LINE 7:"INPUT G$
240 PRINT"LINE 8:"INPUT H$
250 PRINT"LINE 9:"INPUT I$
260 PRINT"LINE 10:"INPUT J$
265 PRINT"LINE 11:"INPUT K$
266 PRINT"LINE 12:"INPUT L$
269 CLS
270 PRINT A$
271 PRINT B$
272 PRINT C$
273 PRINT D$
274 PRINT E$
275 PRINT F$
276 PRINT G$
277 PRINT H$
278 PRINT I$
279 PRINT J$
280 PRINT K$
281 PRINT L$
282 PRINT:PRINT"IS THIS CORRECT (Y OR N)":INPUT AN$
290 IF AN$="Y" THEN 300 ELSE 800
295 REM ROUTINE TO DETERMINE NUMBER OF CARDS TO BE PRINTED
300 PRINT"HOW MANY CARDS DO YOU WANT TO PRINT":INPUT N
305 CLS:PRINT:PRINT:PRINT"POSITION CARDS IN PRINTER. PRESS (SPACEBAR) TO BEGIN PRINTING."
306 Y$=INKEY$:IF Y$="" THEN 306
310 FOR LI=1 TO N
315 REM ROUTINE TO CENTER AND PRINT TOPIC AND HEADLINE
320 LPRINTTAB((42-T)/2)*"---":T$:"---"
330 LPRINTTAB((50-(T2+2))/2)*CHR$(27)*"M"CHR$(11)HL$
331 LPRINT CHR$(27)*"M"CHR$(10)
335 REM LINEPRINT CARD
340 LPRINT
350 LPRINT A$
360 LPRINT B$
370 LPRINT C$

```

```

380 LPRINT D$
390 LPRINT E$
400 LPRINT F$
410 LPRINT G$
420 LPRINT H$
430 LPRINT I$
440 LPRINT J$
441 LPRINT K$
442 LPRINT L$
450 FOR L=1 TO 8
460 LPRINT
470 NEXT L
480 NEXT LI
490 GOTO 10
795 REM ROUTINE TO EDIT TEXT
800 PRINT"WHICH LINE DO YOU WISH TO CHANGE":INPUT AN
805 PRINTTAB(11)*"-----"
810 IF AN=1 THEN PRINT"LINE 1:"INPUT A$
820 IF AN=2 THEN PRINT"LINE 2:"INPUT B$
830 IF AN=3 THEN PRINT"LINE 3:"INPUT C$
840 IF AN=4 THEN PRINT"LINE 4:"INPUT D$
850 IF AN=5 THEN PRINT"LINE 5:"INPUT E$
860 IF AN=6 THEN PRINT"LINE 6:"INPUT F$
870 IF AN=7 THEN PRINT"LINE 7:"INPUT G$
880 IF AN=8 THEN PRINT"LINE 8:"INPUT H$
890 IF AN=9 THEN PRINT"LINE 9:"INPUT I$
900 IF AN=10 THEN PRINT"LINE 10:"INPUT J$
901 IF AN=11 THEN PRINT"LINE 11:"INPUT K$
902 IF AN=12 THEN PRINT"LINE 12:"INPUT L$
910 CLS:GOTO 270
990 REM ROUTINE TO PRINT RETURN ADDRESS
1000 CLS:PRINT"PLEASE TURN THE POSTCARDS OVER IN THE PRINTER."
1010 PRINT:PRINT"INPUT THE RETURN ADDRESS."
1020 PRINT"NAME:"INPUT N$
1030 PRINT"ADDRESS:"INPUT AD$
1040 PRINT"CITY:"INPUT CI$:PRINT"STATE:"INPUT ST$:PRINT"ZIP:"INPUT ZIP$
1050 CLS
1060 PRINT N$
1070 PRINT AD$
1080 PRINT CI$:PRINT"ST$:"ZIP$
1090 PRINT"IS THIS CORRECT":INPUT AN$
1100 IF AN$="Y" THEN 1110 ELSE 1010
1110 CLS:PRINT:PRINT"HOW MANY CARDS ARE TO BE PRINTED":INPUT N
1115 CLS:PRINT:PRINT:PRINT"POSITION CARDS IN PRINTER. PRESS (SPACEBAR) TO BEGIN PRINTING"
1116 Y$=INKEY$:IF Y$="" THEN 1116
1120 FOR I=1 TO N
1130 CLS:PRINT:PRINT:PRINT:PRINT:PRINT:PRINTTAB(20)*"PRINTING IN PROGRESS"
1140 LPRINT N$
1150 LPRINT AD$
1160 LPRINT CI$:PRINT"ST$:"ZIP$
1170 FOR S=1 TO 21
1180 LPRINT
1190 NEXT S
1195 NEXT I
2000 GOTO 10
3000 REM ROUTINE TO ADDRESS INDIVIDUAL CARDS
3010 CLS:PRINT:PRINT:PRINT"INPUT THE ADDRESSEE"
3020 PRINT"NAME:"INPUT N$
3030 PRINT"ADDRESS:"INPUT AD$
3040 PRINT"CITY:"INPUT CI$:PRINT"STATE:"INPUT ST$:PRINT"ZIP:"INPUT ZIP$
3050 CLS:PRINT N$:PRINT AD$
3060 PRINT CI$:PRINT"ST$:"ZIP$
3070 PRINT"IS THIS CORRECT (Y OR N)":INPUT AN$
3080 IF AN$="Y" THEN 3085 ELSE 3010
3085 CLS:PRINT:PRINT:PRINT:PRINT"POSITION CARDS IN PRINTER. PRESS (SPACEBAR) TO BEGIN PRINTING."
3090 Y$=INKEY$:IF Y$="" THEN 3090
3100 CLS:PRINT:PRINT:PRINT:PRINT:PRINT:PRINTTAB(20)*"PRINTING IN PROGRESS"
3110 LPRINTTAB(20) N$:LPRINTTAB(20) AD$
3120 LPRINTTAB(20) CI$:PRINT"ST$:"ZIP$
3130 FOR S=1 TO 21
3140 LPRINT
3150 NEXT S
3160 CLS:PRINT:PRINT:PRINT:PRINT:PRINT"DO YOU WISH TO ADDRESS ANOTHER CARD (Y OR N)":INPUT AN$
3170 IF AN$="Y" THEN 3010 ELSE 10
3999 REM IF YOU DON'T HAVE A MAILING LIST MAKE LINE 4000 GOTO 25
4000 RUN"POSTMAIL/BAS"

```


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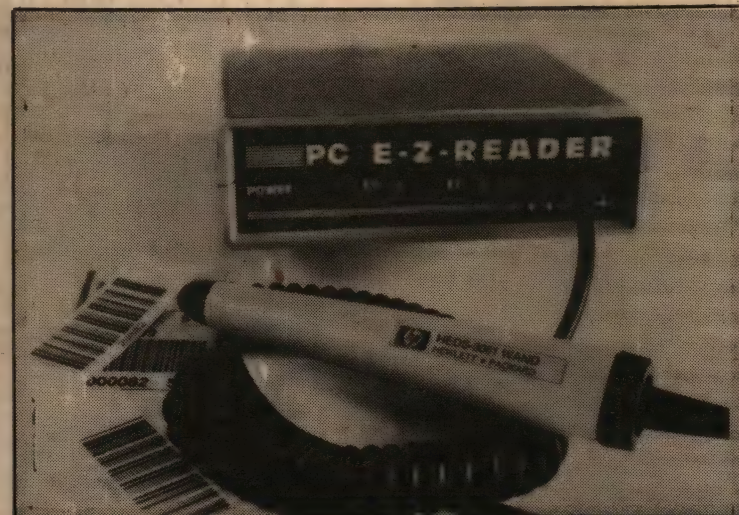
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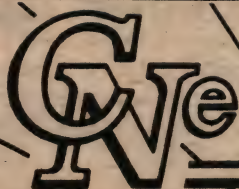
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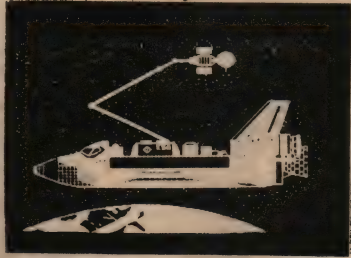
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HI-RES Graphics for TRS-80 Model 4

The Grafyx Solution add-on board gives any configuration of a TRS-80 Model 4 computer (Model III version also available) a resolution of 640 x 240 for a total of 153,600 individually accessible points. This advanced graphics capability opens up numerous new business, personal, engineering, and educational applications. The Grafyx Solution fits completely within the computer and simply plugs into the TRS-80 graphics connector.

The supplied graphics software disk contains over 40 programs and files which make the board easier to use, serve as practical applications, demonstrate its capabilities, and serve as programming examples. The software is compatible with TRSDOS 1.3, 6.1, LDOS, NEWDOS80, and DOSPLUS.

The board also comes with an Extended Graphics Basic which adds over 20 commands to the Basic Language. These commands will set, clear, or complement points, lines, boxes, circles, ellipses, or arcs. Areas may be filled in with any



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of 256 patterns. Sections of the screen may be saved and then put back using any of four logical functions. The hi-res screen can be printed on any of 20 popular printers or saved or loaded to disk without leaving Basic. Labels can be printed in any direction. The viewing area can be changed. Dot densities of 640 x 240, 320 x 240, 160 x 240, 160 x 120 are also provided by Graphics Basic.

The GRAFYX SOLUTION package is shipped from stock and may be ordered from Micro-labs, Inc., 902 Pinecrest, Richardson, TX 75080. (214) 235-0915. The price is \$199.95 and shipping is free on pre-paid orders.

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Cynwyn Offers New HF Antenna Design Program For The TRS-80C Color Computer And MC-10

HF Antenna Design is the latest offering in Cynwyn's software series for amateur radio hobbyists. The program makes the necessary calculations for building three popular types of antennas -- dipole, Yagi, and quad -- for frequencies of 1.8 - 30 MHz and

displays them in an easy-to-read tabular format. Dimensions for the Yagi and quad are optimized for maximum gain.

HF Antenna Design requires a TRS-80C Color Computer with 16K RAM and Extended Color Basic or MC-10 with 4K RAM. The program is avail-

able from Cynwyn on cassette for \$10 plus \$2 shipping/handling.

For further information contact: Cynwyn, 4791 Broadway, Suite 2F, New York, NY 10034. (212) 567-8493.

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MELTDOWN New Game For The TRS-80's

DiskCount Data, a TRS-80 software house has announced a new game titled MELTDOWN for the TRS-80 Models I, III and 4.

The game authored by Stewart F. Hunter is being published under the Micro Mining and Assay Co. label and is said to be a real time simulation of the operation and control of a nuclear power generating station. Screen graphics are utilized to display the actual plant diagram, and a separate control panel screen may be switched in and out while the plant is running.

The object of the simulation is to keep the nuclear plant at peak performance by reacting to various problems which occur during operation. The basic code written by Hunter is completely commented and can serve as a valuable educational tool to would be game programmers.

The program is presently available by mail order, on diskette, through DiskCount Data, 2701-C West 15th Street, Plano, Texas 75075, at \$19.95. Telephone 214-680-8268.

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Cynwyn now offers MC-10 owners Morse Code Teacher, a program aid for learning International Morse code. Morse Code Teacher requires 4K RAM and is available from Cynwyn on cassette for \$15 plus \$2 shipping/handling.

Morse Code Teacher is designed for the beginner to International Morse code and features three different practice routines which promote familiarity with the code and can increase copying speed to up to 5 wpm. In the introductory routine, whenever any letter or number on the computer keyboard is pressed, the program responds with the equivalent character in Morse

code. The second routine generates and sends characters one at a time from predetermined letter/number groups and displays them on

the screen for checking. In the final routine, random letters and numbers are sent at either 3 or 5 wpm for copying sessions of one minute and displayed on

the screen at the end of each session.

For further information, contact:
Cynwyn, 4791 Broadway -

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by Bill Dodd

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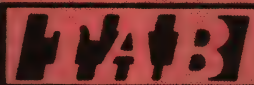
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Continued on page 138



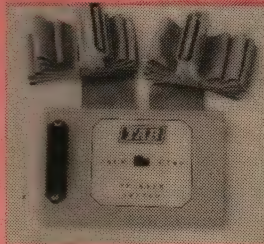
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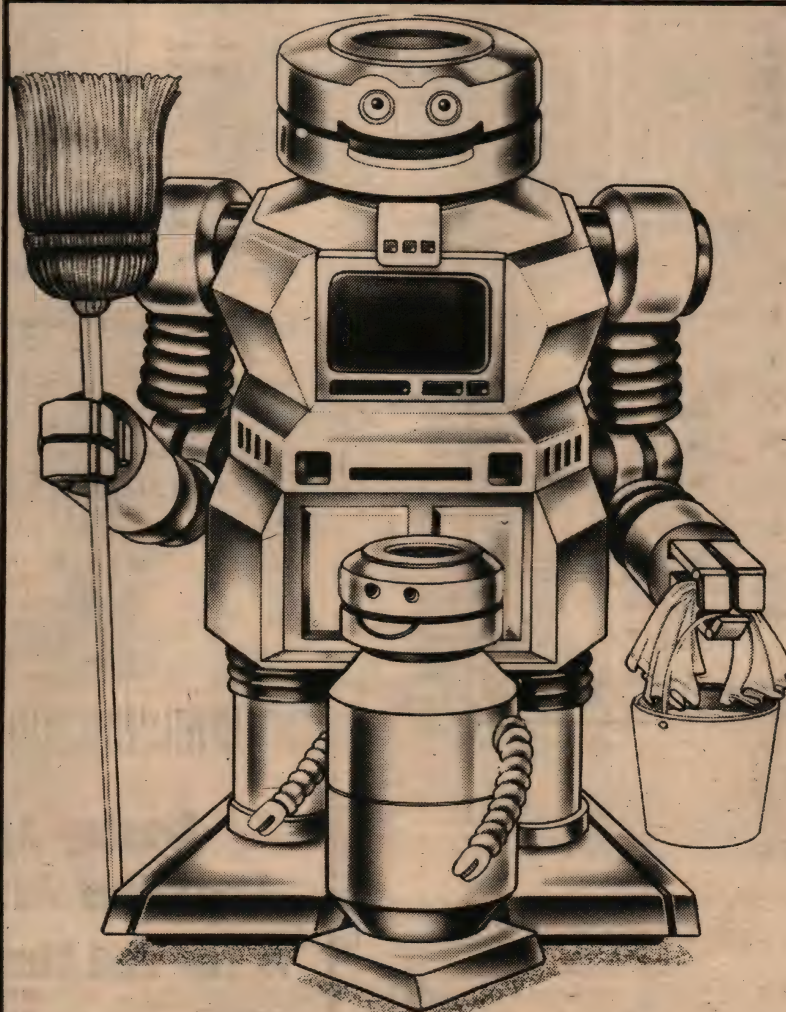
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Robot Controller

Continued from page 137

puter interface on a variety of controller cards.

INTERFACE CARD:

A standard .1" 25/50 edge solder/wire wrap P.C. board from Radio Shack can be used to make the interface card. (See Figure 1) The board will

have to be carefully modified (cut) to get rid of two traces in order to produce a 22/44 edge board. You can solder, or wire wrap the connections, only be sure to use I.C. sockets to allow I.C. access! The circuit in Figure 2 shows how to wire the interface card. The I/O pins (16 plus a ground and a +5VDC) are connected to an 18 pin I.C. socket. An 18 pin M/M connector is used to con-

nect the Interface Card to the controller card. The interface card is designed as a stand-alone assembly, it should be treated in the same manner as the C-64 parallel port. Do not load the CIA down with more than one TTL output, and be sure to keep voltage spikes isolated! The CIA chip can be addressed by either of the two ROM select lines on the expansion port. The author chose the 56832 or DE00 address line# IO #1. Either IO #1, or IO #2 can be used, corresponding to DE00 (56832) or DF00 (57088).

CONTROLLER CARD:

The controller card allows controlling 12VDC relays (100mA max) via signal from the interface card. The controller also allows reading inputs from relay contacts or switches that normally drive the relays. This circuit was designed for R/C control of robot motors in parallel with the computer control. It allows computer monitoring of R/C control (for 'teach-move' routines!) You can revise the circuit to allow inputs isolated from outputs if desired.

Use a 0.1" perf board for wiring this circuit. Figure 3 shows the general layout and Figure 4 shows the schematic. Again, wire wrap or solder the connections to I.C. sockets.

The relay driver outputs must be carefully filtered to prevent spikes from traveling back to the CIA. Additionally, the 5VDC supply to the driver board should be isolated from the computer supply and well filtered (1,000-5,000 Ufds if motors are being driven from the same power supply).

OPERATION:

The program listing shows a sample of how the control card can be used. Note that the eight outputs of one side of the CIA will remain as set when the other eight outputs are addressed and that any combination of inputs/outputs can be set at any time by programming the Data Direction Registers (DDR) of the two 8 bit ports in the CIA.

INPUTS AND OUTPUTS:

Briefly, the DDR's set the Input/Output mode. For ex-

ample to set the A side (8 bits) to Input, simply Poke 56832,0. To set the B side (8 bits) to Output, Poke 56833,255. To set the first 4 Bits of each port to output, Poke 56832,15: Poke 56833,15, etc. Now to turn on the 1st (D0) bit on A Port, Poke 56834,1. To turn on Bits D0, D1, D2, and D3 to output on B Port - Poke 56835,15! Practice with output controlling and use 'FOR NEXT' loops or TIS elements for on/off timing.

To read inputs, the Bit on the DDR must be turned off. To read inputs simply type PRINT PEEK (56832); PEEK (56833). To read selected bits (to exclude for example Bits D0-D3 simply add the ones you want to read. For example, PRINT PEEK (56832 and 240) reads the last 4 Bits - D4, D5, D6, & D7!

This controller, though simple, is versatile and if properly constructed, will give reliable I/O for your Robot or other control project.

See Figure 4
& Program
on page 139

FIG. #1: INTERFACE CARD LAYOUT

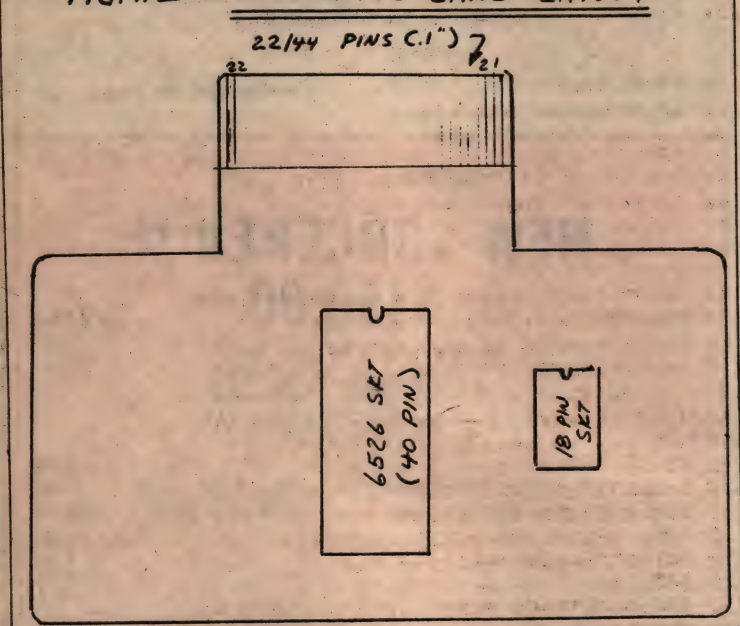


FIG #2: INTERFACE CARD WIRING INSTRUCTIONS

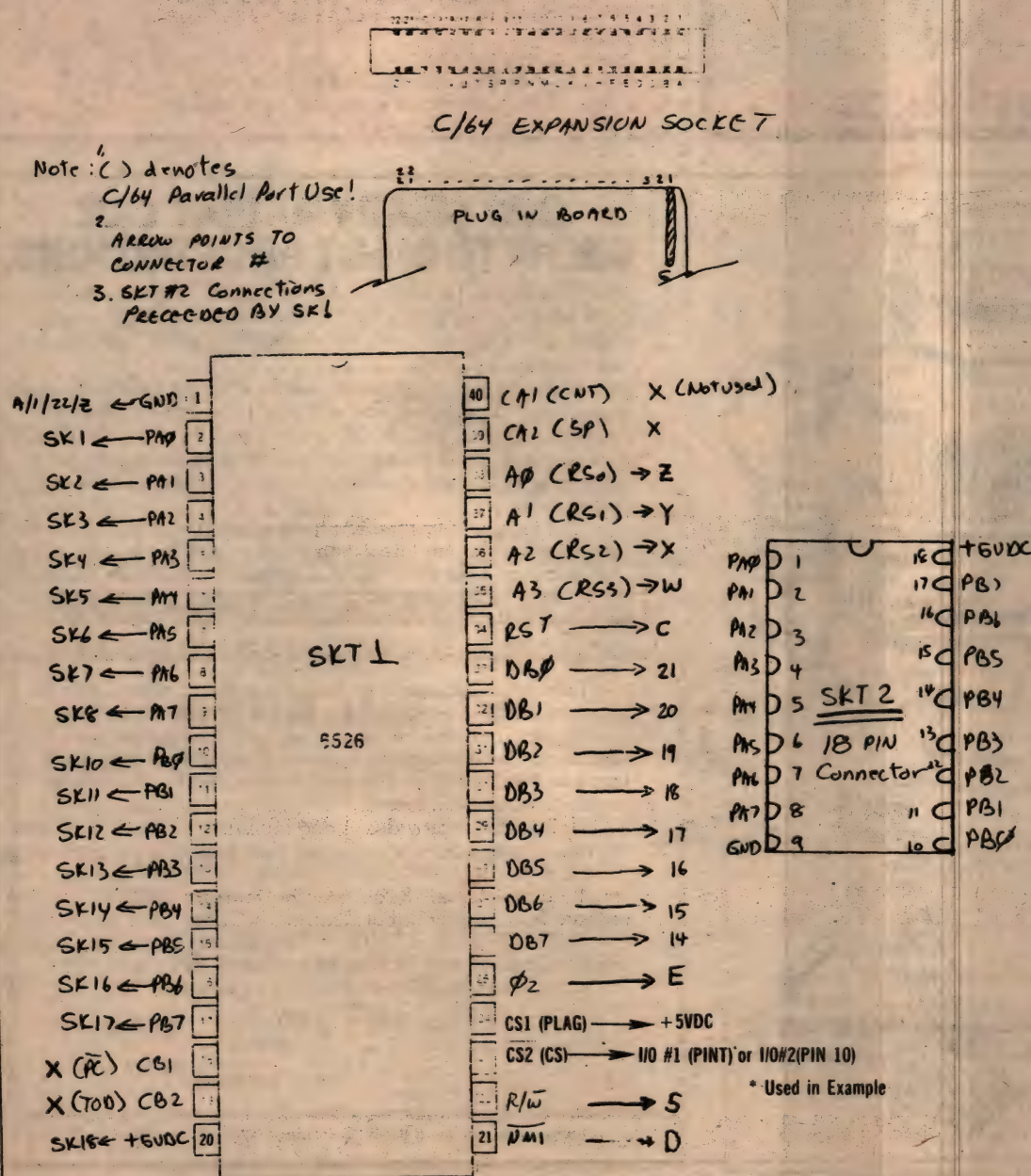
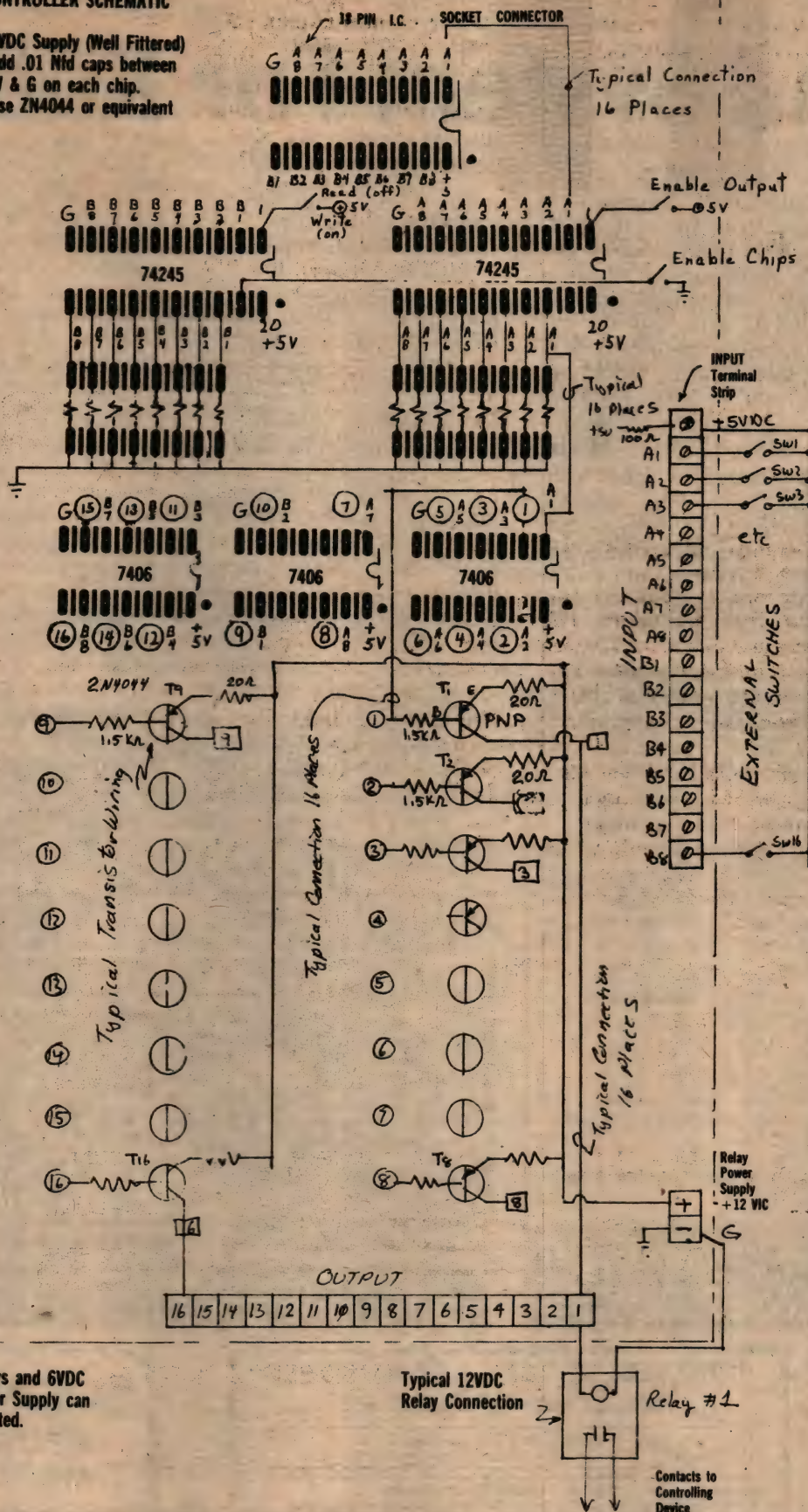


FIG. #4. CONTROLLER SCHEMATIC

- NOTE: 1. 5VDC Supply (Well Filtered)
2. Add .01 Mfd caps between +5V & G on each chip.
3. Use ZN4044 or equivalent



Note: 6VDC Relays and 6VDC Relay Power Supply can be substituted.

```

90 REM SET SCREEN COLORS *****
100 POKE 53281,9
110 POKE 53280,6
120 POKE 646,7
130 L=0
140 DATA 1,2,4,8,16,32,64,128
150 DATA 1,2,4,8,16,32,64,128
160 DIM RLY(16)
170 FOR I=1 TO 16:READ RLY(I):NEXT I
180 REM START PROGRAM *****
190 REM C/64 CONTROLLER EXERCISER
200 REM **** BILL DODD 7/84 ****
210 PRINT "3":PRINT " ";
220 PRINT " SELECT INPUT OR OUTPUT I OR O"
230 GET K$:IF K$="I" THEN GOTO 750
240 IF K$="O" THEN GOTO 260
250 GOTO 230
260 PRINT " RELAY OUTPUT DEMO"
270 PRINT "":PRINT " ENTER RELAY DESIRED";A$
280 PRINT " ENTER Q TO END":PRINT " "
290 INPUT A$
300 IF A$="Q" THEN END
310 A=VAL(A$)
320 IF A>8 THEN X=56833
330 IF A<9 THEN X=56832
340 PRINT "":PRINT " LATCHED OR TIMED? : L OR T"
350 GET B$:IF B$="" THEN GOTO 350
360 IF B$="L" THEN C$="LATCHED":L=1:GOTO 460
370 IF B$="T" THEN C$="TIMED CYCLE":GOTO 390
380 GOTO 350
390 REM SET TIMING *****
400 INPUT "ENTER TIME (IN SECONDS)";TA$
410 TA=VAL(TA$):TB=VAL(TB$)
420 INPUT "NUMBER OF CYCLES";CY
430 INPUT "ENTER OFF TIME (IN SEC)";TB$
440 TB=VAL(TB$)
450 GOTO 480
460 REM OUTPUT ROUTINE *****
470 CY=1
480 PRINT "3";"OUTPUT MODE"
490 REM SET DDR TO OUTPUT
500 POKE 56834,255:POKE 56835,255
510 PRINT "":PRINT "RELAY # ",A
520 PRINT " "
530 IF B$="L" THEN POKE X,RLY(A):GOTO 680
540 PRINT C$+" MODE: "+TA$+"SEC ON "+TB$+"SEC OFF"
550 PRINT "":PRINT CY," CYCLES"
560 REM CYCLED OUTPUT *****
570 FOR C=1 TO CY
580 PRINT " "
590 PRINT "":"CYCLE",C,"RELAY #"+A$+" ON"
600 PRINT " "
610 POKE X,RLY(A)
620 FOR I=1 TO 600*TA:NEXT I
630 POKE X,0:PRINT " OFF"
640 FOR I=1 TO 600*TB:NEXT I
650 NEXT C
660 PRINT " CYCLE COMPLETED"
670 FOR I=1 TO 300:NEXT I:GOTO 180
680 REM LATCHED MODE *****
690 PRINT "LATCHED MODE";
700 PRINT "HIT ANY KEY TO TURN OFF RELAY"
710 GET X$:IF X$="" THEN GOTO 710
720 POKE 56834,0:POKE 56835,0
730 PRINT "RELAY OFF:FOR I=1 TO 1000:NEXT I
740 GOTO 180
750 REM INPUT ROUTINE *****
760 REM SET DDR TO INPUT
770 POKE 56834,0:POKE 56835,0
780 REM READ PORT A AND B
790 PRINTS,"A";PEEK(56832);" B:";PEEK(56833)
800 REM TIMING LOOP
810 FOR I=1 TO 100: NEXT I
820 GET Q$:IF Q$="Q" THEN GOTO 180
830 S=S+1:GOTO 790
    
```

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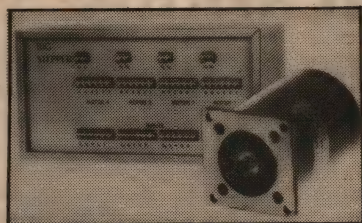
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troduced in September 1982, was the world's first fully programmable, mobile robot targeted specifically to the home, school, and business markets. It is generally considered by analysts of the personal robot industry to be the best-designed and most versatile of the personal robots now on the market.

RB Robot remains fully operational and company of-

ficials do not anticipate that the action will adversely affect shipments of the RB5X to the firm's worldwide dealer/distributor network.

For further information, contact Sharon D. Smith, RB Robot Corporation, 18301 West 10th Avenue, Suite 310, Golden, Colorado 80401, (303)279-5525.

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Polaroid Rangefinder For Robot

Interface Technology announces the latest in their product line for the Heath ET-18 "HERO" Robot. The Polaroid Rangefinder interface includes all the hardware and software to use the Polaroid ultrasonic distance measuring unit on the Robot. Included are the ultrasonic transducer, Polaroid circuit board, and interface board in a plastic housing for mounting on the Robot. Software is included for inputting the data, converting it to distance, and displaying it. The included software may be used as a subroutine.

A planned enhancement includes the use of multiple transducers with the same electronics for angle resolution of

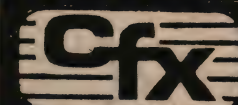
echos or front/back/side sonar.

All distance timing is done in software. The range is 35 feet, with a resolution below a fraction of an inch, set by the software timing.

The unit is available for an introductory price of \$89 complete. It is fully assembled and ready to install on the Robot. For other applications, it requires 2 input and one output bit at TTL levels. The demo software is for a Motorola 6800 Family Computer.

For further information contact: Interface Technology, Inc. Box 745, College Park, MD 20740; (301)490-3608.

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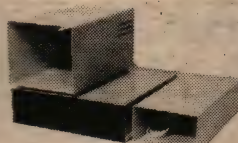
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New Production Robot Systems For Light-Assembly Applications

Microbot Inc. has introduced a small, low-cost production robot system -- the Alpha II -- designed to automate simple tasks. The company also announced the availability of its Robotic Dispensing System, a turnkey robot system that performs printed-circuit board solder masking, applies adhesives and dispenses other fluids.

The Microbot Alpha II can

perform simple applications in such industries as electronics and pharmaceuticals. Less expensive than conventional light-assembly robots that perform intricate work beyond the range of human precision, the Alpha II can assume human-equivalent tasks, especially those that are repetitive or dangerous.

"The Microbot Alpha II offers customers the benefits of

flexible automation: improved productivity, labor and material savings and increased quality and yield," said Guy W. "Dusty" Rhodes, president of Microbot. "In many cases, these benefits offer the distinct advantage of 12-month or better payback."

"We believe that many customers need to automate simple tasks now performed by unskilled factory workers -- tasks that are dirty, dull or dangerous and better assigned to a robot. This makes sense economically as well as in terms of human resources, where human employees can be reassigned to perform more satisfying work," Rhodes said.

The Microbot Alpha II is a more sophisticated, more rugged version of the Microbot Alpha, which already has been installed to perform such applications as handling semiconductor wafers and cassettes, transferring and handling chemical samples, packaging pharmaceuticals, dispensing fluids onto printed-circuit boards, applying coatings to lenses and dip soldering transformer coils.

Advanced Tendon Technology

The Alpha II features tendon technology, a precision stainless steel cable system similar to that used in high-speed computer printers. The stepper motors that move the robot arm are located in the base of the robot instead of on the joints, and the cables running from the motors to the joints drive the arm's movement.

The robot system control stores up to 227 program steps in permanent memory. It can

be programmed through a hand-held device called a "teach control," which contains 14 multifunction keys. Users need not know computer programming to use the teach control. In addition, however, the robot can be programmed and controlled through an external computer via an RS-232 asynchronous serial interface. Experienced computer users can also program in X, Y, Z coordinates.

An 8-bit 6502A microprocessor in the Microbot Alpha II has 8 kilobytes of EPROM, 4 kilobytes of EEPROM and 1 kilobyte of RAM. The robot's work cell interface, which contains 18 input/output channels for optically isolated interfaces at factory voltage levels, connects the robot to sensors, actuators and other peripherals in the work cell.

The arm, which reaches to 18 inches, can move at selectable speeds up to a maximum of 51 inches per second and can carry a maximum payload of 3 pounds. Repeatability is +0.015 inches at payloads of up to 1½ pounds.

Accessories

The basic Microbot Alpha II consists of the five-axis articulated robot arm and the system control. Two optional auxiliary motors -- accessories to the basic system that can be used to drive slides, conveyors, rotation tables and other positioning devices -- add two more possible axes of movement.

Gripper options for the Alpha II include a standard mechanical gripper and two-

and three-fingered pneumatic grippers. Other accessories include the teach control and the operator control.

Robotic Dispensing System

Microbot's Robotic Dispensing System is the company's first turnkey robot system. It can perform a variety of fluid dispensing applications, such as solder masking for printed-circuit boards.

The dispensing system includes a 12-ounce pressurized reservoir with an anti-drip dispensing valve, a compressed air filter regulator, a solenoid valve and all hoses necessary to operate the system.

The Robotic Dispensing System comes with a platform fixture to accurately locate and position work pieces. It can be programmed through the teach control, which is included with the system.

Price and Availability

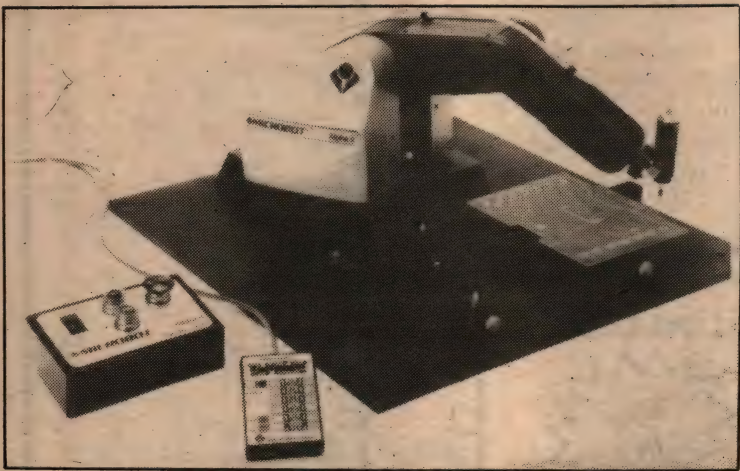
Both the Alpha II and the Robotic Dispensing System are available now. The Alpha II costs \$13,425 and the Robotic Dispensing System costs \$19,350. Prices for accessories to the Alpha II include the teach control at \$595, the operator control at \$395, the standard mechanical gripper at \$600 and auxiliary motors at \$680 each or two for \$1,120.

Microbot Inc., Mountain View, develops and manufactures small, programmable, easy-to-use robot systems designed to automate simple tasks in light-assembly operations.

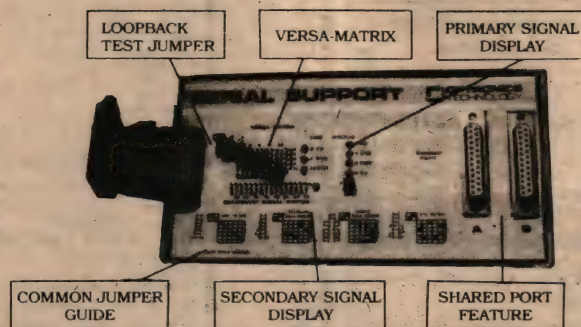
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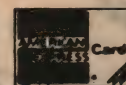
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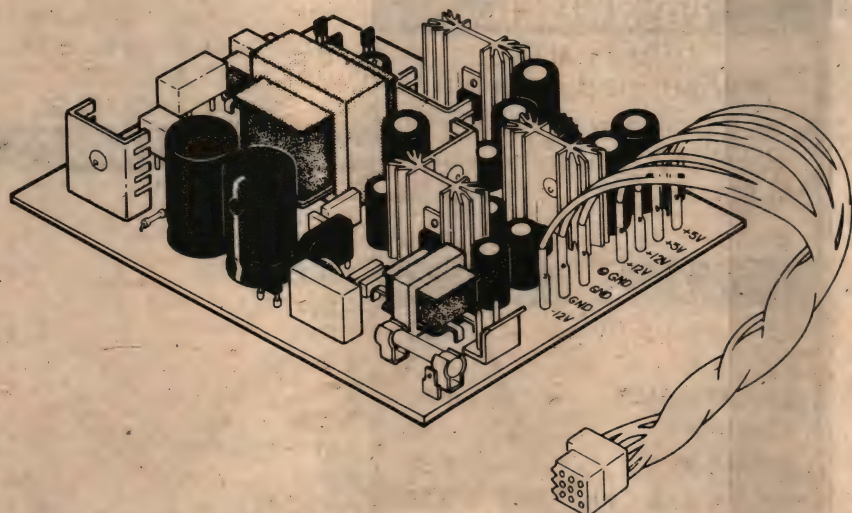
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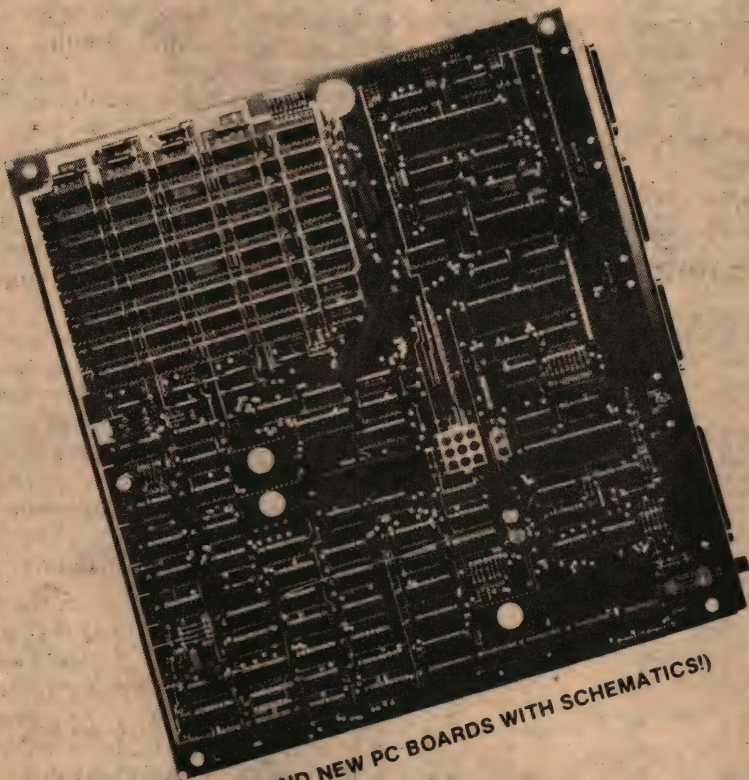
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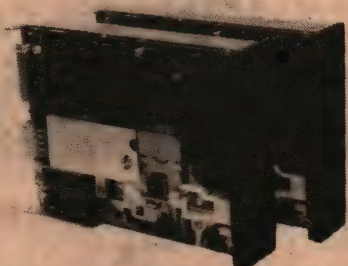
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The program, which operates on the IBM PC and certain IBM-compatible machines, has been called the first practical application of artificial intelligence to the microcomputer.

The highly-adaptable program can serve organizations large or small, including businesses, schools, and government agencies. Other potential users include persons who work extensively with in-

formation, such as lawyers, brokers, writers, and salespeople. The program can help with almost any category of decision-making, including whether to buy stock, how to fix a car, or what to serve for dinner.

Designed in spreadsheet format, Expert-Ease collects data by guiding the user through a series of simple prompts. The program then can answer questions based on the information fed previously into the computer.

Expert-Ease enables a person to store his or her knowledge on a subject for others to use. A doctor, for example, can describe to the machine how to diagnose kidney disease. A non-expert then can use the program to make the same diagnosis the doctor would have made in a similar situation. The human expert need not be present in order to have his or her knowledge and judgment available to others.

The program's central concept is to define things by listing their characteristics. An architect, for instance, can describe various types of houses in terms of cost, materials, and suitability for different locations. A novice then can ask the program which kind of house to build on his property. Moments after answering the program's questions, the novice receives an expert recommendation.

More than simply regurgitating facts that someone has stored, Expert-Ease spots patterns among facts and forms logical conclusions. For this reason, independent reviewers have agreed that the software product has artificial intelligence. Its powers of logic enable Expert-Ease to zero in very rapidly on the answer to a user's question. In effect the program "knows" how to eliminate illogical or irrelevant possibilities among its selection of answers.

Expert-Ease is based on artificial intelligence research by Professor Donald Michie and J. Ross Quinlan of the University of Edinburgh. The software product is manufactured by Export Software International Ltd. Jeffrey Perrone & Associates of San Francisco and Expert Systems Inc. of New York are the exclusive distributors for the western and eastern United States.

For more information contact Jeffrey Perrone & Associates, 3685 17th Street, San Francisco, California 94114; (415)431-9562.

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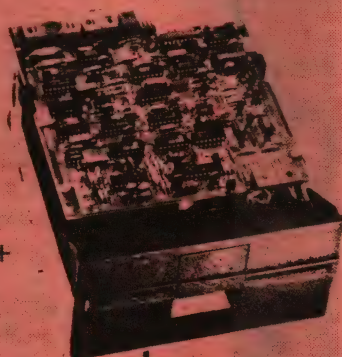
TM100-2	1-9	10-24	25+
	\$189	\$179	\$169
TM100-4			
	\$249	\$229	\$209

Other models at similar discounts. COD + shipping and handling, subject to availabilities.

DRS

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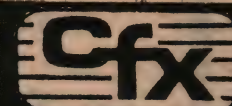
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- * All leading brands
- * CDC - Tandon - MPI - Shugart
- * Restore like new

Single sided - \$24 + Parts
Double sided - \$10 more + parts

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TPC I

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Bulletin Board

BULLETIN BOARD

The Bulletin Board is a regular feature of *Computer Shopper*. This is where you can list your public access of community bulletin board at no charge. If you would like to have your name, BBS and phone number listed send it to us. BBS listings are in area code sequence.

Send listings to:

Computer Shopper
Bulletin Board
Post Office Box F
Titusville, FL 32781

Important Notice On Bulletin Boards

New Procedure For Registering Your Board

It has come to our attention that many of the BBS listed in the Computer Shopper are inactive. This situation requires corrections by us and by the operators of BBS. Everyone sends in a listing when they START a board but very few people send us notice that their board has become inactive so we can remove their listing. Frankly, we do not have time to keep checking, by calling boards all over the country. Mr. Paul Raymer of Paul's Electric Computer in Las Vegas, NV has suggested a system for avoiding this situation. Like all great ideas it is simple and direct, so we will use it. Mr. Raymer wins an additional year's subscription for the idea.

Starting now - All BBS Listings are good for three months. After that period they will be purged unless we receive a Post Card or Letter saying the board is active. In addition, any reader who contacts a board can confirm that it is active, but it is up to the SYSOP to keep us current.

We thank you for your cooperation. We will keep the listings on a Data Base so please send in your notices every three months.

Thank You

ABBS Apple-Mate, New York, NY 201-864-5345
ABBS CNNI, Pompton Plains, NJ 201-835-7499
ABBS Livingston, NJ 201-994-9620*24
AMIS, Park Ridge, NJ 201-391-5519
Aphrodite-E, NJ 201-831-1042
Apple Oasis, Chester, NJ 201-879-4392, 5PM to 12AM
ARMUDIC Washington, DC 201-276-8342
Atari/Edison, NJ 201-549-7591
CFONJ/TBBS, Linden, NJ 201-486-2956, 300/1200 Baud, 24 hours
Conference-Three Flagship, Denville, NJ 201-627-5151*24
Dial-Your-Match #14 201-272-3686
Dial-Your-Match #21 201-462-0435
Forum-80 Monmouth Brielle, NJ 201-528-6623
General Store, Hillsdale, NJ 201-666-2646*24
New Jersey Telecom 201-635-0705*24
Photo-80, Haledon, NJ 201-790-6795
PMS Rutgers Univ. MicroLab Piscataway, NJ 201-932-3887
PMS Shrewsbury, NJ 201-747-6768
RATS Systems 201-887-8874
RCPI/MCBBBS Flanders, NJ 201-584-9227*24
RCPI/M TPM (RIBBS) Englishtown, NJ 201-446-6359*24
RCPI/M RBBBS Ocean, NJ 201-775-8705
RCPI/M RBBBS Paul Bogdanovich, NJ 201-747-7301
RCPI/M RBBBS New Brunswick, NJ 201-932-3879*24
TBBS Metuchen, NJ 201-494-3649*24
TBBS Brick, NJ 201-477-7263
TBBS Tom's River, NJ 201-929-8161
ARMU Washington, 202-276-8342

PCPI/M RBBBS Cranford, NJ 202-272-1874
PSBBS Washington, DC 202-337-4694*24
BULLET-80 Danbury, CT 203-744-4644
BULLET-80 Seymour, CT 203-888-7952
The Switchboard Network Clinton, CT 203-669-3456
Telecom 7 New Fairfield, CT 203-746-5763*24
FORUM-80 Montgomery, AL 205-272-5069
RCPI/M RBBBS Huntsville, AL 205-895-6749
ABBS Apple Crate I, Seattle, WA 206-935-9119
ABBS Apple Crate II, Seattle, WA 206-244-5438
A-C-E-S-S Olympia, WA 206-866-9043*24
AMIS Space Washington, 206-525-3412
ARBB Seattle, WA 206-546-6239
Dial-Your-Match #16 206-256-6624
Forum-80 Seattle, WA 206-723-3282
IQ Technology, Washington DC 206-451-0232
JCTS Redmond, WA 206-883-0403*24
Mail Board-82 Seattle, WA 206-527-0897*24
Mini-Bin Seattle, WA 206-762-5141*24
MSC-80 Everett, WA 206-334-7394
PCPI/M Silicon Valley, CA 206-458-3086
PMS-Software Unlimited Kenmore, WA 206-486-2368*24
Seacomm-80 Seattle, WA 206-763-8879*24
The Constant Society, Seattle, WA 206-525-5947
TBBS, Portland, Maine 207-797-5690
IFBBS, Idaho Falls, ID 208-523-7400, 300/1200 Baud, *24
CBBS Sequoia Computer, Visalia, CA 209-739-1776
Dial-Your-Match #26 Clovis, CA 209-298-1328
ABBS Queens, NY 212-896-0519
AMIS, Info New York, 212-767-6633
AMIS, New York, 212-241-8965
AMIS, New York 212-568-0682
Bronx BBS, NY 212-933-9459
BULLET-80 New York, NY 212-740-5680*24
COMM-80 Queens, NY 212-897-3392*24
CONNECTION-80 Manhattan, NY 212-991-1664
CONNECTION-80 212-441-3755*24
FIREFOX Computer World, NY 212-454-1462*24
Nybbs-80 NY 212-626-0375
Paladin's Palace, FOREM CBB, Queens, NY 212-699-0861*24
PGA Nat'l Library New York, NY 212-420-0953
PMS McGraw Hill Books, New York, NY 212-997-2488
SISTER Staten Island, NY 212-442-3874*24
TCBBS Astrocom, New York, NY 212-799-4649
TCBBS B.A.M.S. New York, NY 212-362-1040*24
TCBBS Leigh's Computer World, NY 212-879-7698
The Database BBS 212-772-7167
Vineyard Computer World, NY 212-357-5679*24
ABBS Computer Conspiracy Santa Monica, CA 213-829-1140
ABBS Pacific Palisades, Los Angeles, CA 213-459-6400
All Night BBS 213-564-7636
AMIS TABBS, California 213-366-2125
AMIS WVAUG, California 213-783-8373
BBS B.R. Los Angeles, CA 213-394-5950*24
Computer Connection 213-657-1799
CONFERENCE-TREE #4 Santa Monica, CA 213-394-1505
CONFERENCE-TREE Kelp Bed, Los Angeles, CA 213-372-4800
Datamate Canoga Park, CA 213-998-7992
Dial-Your-Match #1 213-842-3322
Dial-Your-Match #4 213-783-2305
Dial-Your-Match #7 213-840-8252
Dial-Your-Match #9 213-345-1047
Dial-Your-Match #11 213-242-1882
Dial-Your-Match #25 213-842-9452
Dial-Your-Match #28 213-764-8000
Dial-Your-Match #36 213-452-6111
Dragons Game System 213-428-5206
Electric Line Conn. Sherman Oaks, CA 213-789-9512
FUNNY PHARM, California, 213-410-0221*24
FUNNY PHARM II, California, 213-631-7328*24
FUNNY PHARM III, California, 213-637-0121*24
FUNNY PHARM IV, California, 213-822-3553*24
FUNNY PHARM V, California, 213-631-2911
FUNNY PHARM VI, California, 213-316-6033
Green Machine, Los Alamitos, CA 213-431-1443
Greene Machine Frisched Chien, Arcadia, CA 213-445-3591
Greene Machine Temple City, CA 213-287-1363
Kandy Shack #3 Artesia, CA 213-402-1616
Kluge Computer 213-947-8128*24
L.A. Interchange Los Angeles, CA 213-631-3186*24
Long Beach Community Computer 213-591-7239*24
NET-WORKS Coin Games Los Angeles, CA 213-336-5535
NET-WORKS Computer World Los Angeles, CA 213-859-0894*24
Novation Co., Los Angeles, CA 213-881-6880
Oracle North Hollywood, CA 213-980-5643
NET-WORKS Magnetic Fantasies Los Angeles, CA 213-388-5198
NET-WORKS Softworks Los Angeles, CA 213-473-2754
PASSBS Torrance, CA 213-516-7089*24
PMS Los Angeles, CA 213-334-7614*24
PMS O.A.C. Woodland Hills, CA 213-346-1849*24
RCPI/M CBBS Pasadena, CA 213-799-1632*24
RCPI/M RBBBS BBS Valley 213-360-5053
RCPI/M RBBBS Palos Verdes, CA 213-541-2503*24
RCPI/M RBBBS Software Store Los Angeles, CA 213-296-5927*24
ABBS Dallas Info Board 214-248-4539
ABBS Teledunjon Dallas, TX 214-960-7654
ABBS Teledunjon I Dallas, TX 214-530-0858
ABBS The Moon, Dallas, TX 214-931-3437, 3436, 3438, 3439
AMIS Dallas, TX 214-680-9018
BBS-80 DALTRUG Dallas, TX 214-235-8784*24
BULLET-80 Hawkins, TX 214-769-3036

NET-WORKS Apple Grove Dallas, TX 214-644-5197
NET-WORKS Apple Shack, Dallas, TX 214-644-4781*24
NET-WORKS Dallas, TX 214-361-1386*24
NET-WORKS Electric Computer Dallas, TX 214-239-5842
NET-WORKS Hacker-net Dallas, TX 214-824-7160
NET-WORKS Winesap Dallas, TX 214-824-7455
RCPI/M CBBS Dallas, TX 214-913-8274
AMIS BBS, Pennsylvania 215-333-3753
AMIS Pennsylvania 215-250-9471
AMIS Pennsylvania 215-432-9848
BULLET-80 Langhorne, PA 215-364-2180
Comnet-80 North Wales, PA 215-855-3809
Hemres-80 Allentown, PA 215-434-3998
Lehigh Press BB, PA 215-435-3388
RBBBS Pennsylvania 215-398-3937
RBBBS Pennsylvania 215-836-5116
TBBS Reading, PA 215-929-5348
ABBS Akron Digital Group Akron, OH 216-745-7855*24
ATARI Ohio 216-582-2797
BBS Computer Applications Poland, OH 216-757-3711
BULLET-80 Chesterland, OH 216-729-2769
COMNET-80 Akron, OH 216-645-0827*24
Forum-80 Cleveland, OH 216-486-4176
PMS Massillon, OH 216-832-8392*24
PMS RAUG Akron, OH 216-867-7463*24
RBBBS Lorain, OH 216-282-3423
TBBS of Akron 216-724-2125*24
Central II. Connection Riverton, IL 217-629-7006*24
NET-WORKS C.A.M.S. Decatur, IL 217-429-5541
TRS-80 Effingham, IL 217-347-5884*24
AMIS Hart City, Elkhart, IN 219-262-3980
AMIS BBS Parlor City, Bluffton, Ind. 219-824-2982*24
ABBS Computer Crossroads Columbia, MO 301-730-0922
A-C-E-S-S Annapolis, MD 301-267-7666*24
ARMUDIC Computer Age Baltimore, MD 301-587-2132
ATARI Severna Park, MD 301-544-2460
Baltimore Com Connection, Baltimore, MD 301-366-3745
BBS IBM, 300/4501/200 BAUD, 301-267-4930*24
BBS IBM Beltsville, MD 301-937-4339*24
BBS IBM Bethesda, MD 301-460-0538*24
BBS IBM Gaithersburg, MD 301-251-6293*24
BBS IBM PC Rockville, MD 301-949-8848*24
CBBS Gaithersburg, MD 301-948-5717
CONNECTION-80Gaithersburg, MD 301-840-8588*24
FUNNY PHARM VII, 301-345-5937
FUNNY PHARM VIII, 301-299-6202
FUNNY PHARM IX, 301-871-7339
FUNNY PHARM X, 301-936-2306
Hex Silver Spring, MD 301-593-7033*24
NETWORKS Laurel, MD 301-953-3341 & 301-792-0305
PMS Baltimore, MD 301-764-1995*24
PMS Ellicott City, MD 301-465-3176
PMS Pikesville, MD 301-653-3413
PSBBS Baltimore, MD 301-994-0399*24
RCPI/M BBS Bethesda, MD 301-229-3196
RCPI/M BBS Laurel, MD 301-953-3753*24
Remote Northstar NASA, Greenbelt, MD 301-344-9156
THE HEADQUARTERS, Potomac, MD 301-299-9538
TBBS Washington DC 301-434-0117
TBBS Newark, DE 302-322-3999
ABBS Denver, CO 303-759-2625
AMIS Denver, CO 303-758-6233
ATARI Colorado 303-221-1779
BBS IBM PC Denver, CO 303-773-2699*24
BARDNET Ft Collins, CO 303-493-1068
CONNECTION-80 Denver, CO 303-690-4586*24
Electric Magazine, 303-340-2473*24
FORUM-80 #2 Denver, CO 303-399-8858*24
HBBS "Denver, CO 303-343-8401*24
Mouse Hole - Atari Lakewood, CO 303-988-5562
Pinecliff RMPM Pine Cliff, CO 303-642-3034
RCPI/M CUG-NOTE Denver, CO 303-781-4937*24
RCPI/M RBBBS Arvada Elec. Colorado Springs, CO 303-634-1158*24
RCPI/M RBBBS Boulder, CO 303-499-9169
Remote Northstar Denver, CO 303-444-7231
NETWORKS ABBS, Info International NW, Reddy, WV 304-927-1773
NET-WORKS Charleston, WV 304-345-8280
ABBS West Palm Beach, FL 305-848-3802
AMIS-Devo 305-652-9422*24
BBS Homestead, FL 305-246-1111
BBS The Notebook, West Palm Bch., FL 305-686-4862
Cecil's Nite Owl Palm Beach, FL 305-588-0487*24
Chalkboard Hollywood, FL 305-962-6052*24
Church of God's Trade 80 Ft. Lauderdale, FL 305-525-1192
CLOUD BURST, Ft. Lauderdale 305-525-1192*24
El-shih-Oh, Cocoa, FL 305-783-8905*24
FORUM-80 Ft. Lauderdale, FL 305-772-4444*24
GREENE MACHINE SPACECOAST 305-268-8356*24
GREEN MACHINE SPACECOAST 2305-453-6561*24
HEATHKIT Ft. Lauderdale 305-791-7302
INFOEX-80 West Palm Beach, FL 305-683-6044*24
LYNX I BBS, Ft. Lauderdale 305-772-1076*24
CABLE BOX, Pembroke Pines 305-432-5969*24
Micro-80 West Palm Beach, FL 305-686-3695
NETWORKS Software Centrum 305-441-2983 # 8PM-8AM
NET-WORKS Big Apple, Miami, FL 305-948-8000
ORACLE, Deerfield Bch., FL 305-475-9062
Pirate-80 305-255-8059*24
RBBBS-Heath Kit 305-823-2281 6PM-8AM
RBBBS-Southern Micro 305-625-3181*24
SCAUG BBS, Merritt Island, FL 305-453-6998
TBBS, Orlando, FL 305-644-8327*24
TBBS, Winter Park, 305-644-8327
Tech-80 305-266-1032*24
The Byte Shop, 305-261-3639, Networks Not BBS
TBBS West Palm, FL 305-793-8050
TRADE-80 Ft. Lauderdale, FL 305-525-1192
TRADE-80 of Miami 305-947-7930*24
TRADE-80, Pompano Beach 305-426-8080*24
YBBS, Magic City, 305-271-6644*24
YBBS, The Heath Bar, 305-940-8795, 7pm to 6am
YBBS, J.I. OUI BBS, 1200 BAUD, Miami FL 305-652-3005
PET BBS Se Wyming PUG 307-637-6045*24
NET-WORKS MAGIE, Galesburg, IL 309-342-7178
ABBS Chicago, IL 312-743-3153
ABBS CODE, Glen Ellyn, IL 312-537-7063*24
ABBS Gamemaster, Chicago, IL 312-475-4884*24
ABBS Illinois Microcomputer, Naperville, IL 312-420-7995
ABBS Lincolnwood, IL 312-674-6502
ABBS Rogers Park, Chicago, IL 312-973-2227
AMIS Chicago, IL 312-789-3610*24
AMIS Lombard, IL 312-620-6441
BBS IBM, CHICAGO, IL 312-259-8086*24
CBBS Chicago, IL 312-545-8086*24

CBBS Chicago, IL 312-876-0974
CBBS Dolton, IL 312-849-1132
CBBS Palatine, IL 312-397-0360
Chicago Green Machine 312-622-4442
CNODE LaGrange Park, IL 312-352-5681
CO-OP BBS, Arlington Heights, IL 312-228-1495
CP/M Chicago, IL 312-326-4392
CP/M Chicago, IL 312-328-8827
CP/M Chicago, IL 312-537-7888
CP/M Chicago, IL 312-861-1797
CP/M Downers Grove, IL 312-852-1305
CP/M Glen Ellyn 312-469-2597
Dial-Your-Match #39, 312-243-1046
HCOM Chicago, IL 312-267-2066
HP1 Palatine, IL 312-397-8308
MAGS Hickory Hills, IL 312-598-4861
MCMS C.A.M.S. Chicago, IL 312-927-1020*24
MCMS Hanover Park, IL 312-289-7619
MCMS L.A.M.S. Round Lake, IL 312-740-9128
MCMS Metro West Database, Chicago, IL 312-260-0640*24
MCMS P.C.M.S. Wheaton, IL 312-260-0640*24
MCMS Waco Hotline, Schaumburg, IL 312-351-4374*24
MCMS Wheaton, IL 312-462-7560
NESSY Chicago, IL 312-773-3308
NET Arlington Heights, IL 312-392-2403
NET+ Arlington Heights, IL 312-398-0970
NET+ Chicago, IL 312-545-5866
NET Chicago, IL 312-685-9573
NET+ Chicago, IL 312-528-1611
NET+ Chicago, IL 312-644-5165
NET Chicago, IL 312-267-2065
NET Chicago, IL 312-278-7251
NET Lombard, IL 312-627-5138
NET Wheaton, IL 312-260-0748
NET Skokie, IL 312-674-9246
NET-WORKS Chipmunk, Hinsdale, IL 312-323-3741*24
NET-WORKS North Parks, Chicago, IL 312-745-0924
OCCCS #2 Wheaton, IL 312-588-7917
ONL Chicago, IL 312-648-4867
OT Berwyn, IL 312-795-0871
OT Elk Grove, IL 312-529-1673
PBBS Co-Operative Com, Palatine, IL 312-359-9450*24
PCM Chicago, IL 312-376-7598
PCM Midlothian, IL 312-396-1022
PET BBS Commodore Chicago, IL 312-397-0871*24
PMS: Chicago Public Library 312-235-3200
PMS Chicago, IL 312-733-8057*24
PMS Downers Grove / SRT, Downers Grove, IL 312-964-6513
PMS I.A.C. Lake Forest, IL 312-295-6926*24
RATS Homewood, IL 312-957-3924
RIPCO, 1200/300 BAUD, Chicago, IL 312-528-5020*24
RCPI/M A. B. Dick Co., Niles, IL 312-647-7636*24
RCPI/M AIMS Hinsdale, IL 312-789-0499*24
RCPI/M IBM PC Niles, IL 312-259-8086
RCPI/M Logan Square, Chicago, IL 312-252-2136
RCPI/M NEI, Chicago, IL 312-949-6189
TBBS Chicago, IL 312-445-4545
TIBBS Oak Park, IL 312-848-3669
University Conference Information Net, Chicago, IL 312-942-0089
AMIS Bellwood, IL 312-544-7228
ABBS Detroit, MI 313-477-4471
ABBS Michigan Apple-Fone Southfield MI 313-357-1422
AMIS A.R.C.A.D.E. Sterling Hgts., MI 313-978-8087*24
AMIS M.A.C.E. Detroit, MI 313-868-2064*24
AMIS MACE Michigan 313-274-3940
AMIS Michigan 313-544-0885
Apple-gram 313-852-8056
BBS Metro Detroit, MI 313-455-4227
BULLET-80 Waterford, MI 313-683-5076*24
CBM-U Commodore Holly, MI 313-634-2973*24
CBM-U Commodore Detroit, MI 313-273-9551*24
CBM-U Commodore Fenton, MI 313-629-8579*24
CCCC BBS Canton, MI 313-981-5061
COMNET-80 Mt. Clemens, MI 313-465-9531
Davy Jones Locker 313-764-1837
Dial-Your-Match #37 313-736-1398
RCPI/M Detroit, MI 313-584-1044
RCPI/M MCBBBS Keith Peterson, Royal Oak, MI 313-759-6569
RCPI/M MCBBBS TCBBBS Dearborn, MI 313-846-6127*24
RCPI/M RBBBS Pontiac, MI 313-338-8505
RCPI/M RBBBS Southfield, MI 313-559-5326*24
RCPI/M RBBBS Westland, MI 313-729-1905
SYSTEMS PLUS, 3600 S. Dort, Flint, MI 48506, 313-742-6932
TIBBS, Detroit, MI 313-288-0530
TIBBS, Oak Park, MI 313-544-7788
TBBS The Waterford Computer Exchange 313-623-1089
TIBBS, Royal Oak, MI 313-288-0530
Treasure Island 313-547-7903
Twilight Phone 313-775-1649*24
Westside Download Detroit, MI 313-533-0254
ABBS Century Next Computers, St. Louis, MO 314-442-6502
ABBS St. Louis, MO 314-838-7784*24
AMIS ComputerCave Missouri 314-432-7034
Midwest St. Louis, MO 314-227-4312
NET-WORKS Computer Station, St. Louis, MO 314-432-7120
PET BBS Commodore Comm. Lake, St. Louis, MO 314-625-4576
FORUM-80 Wichita, KS 316-682-2113*24
TIBBS Wichita, KS 316-681-3167
PMS Indianapolis, IN 317-787-5486
PMS Software Exchange, Indianapolis, IN 317-251-7796, 8:30PM to 10AM
DIAL-YOUR-MATCH # 66, Lafayette, LA 318-233-7472
FORUM-80 Shreveport, LA 318-631-7107*24
STAR (LINC) BBS, Lafayette, LA 318-237-3350
ABBS Apple-Med., Iowa City, IA 319-353-6528
IBM-PC Cedar Rapids, IA 319-363-3314
AMIS Rhode Island 401-521-1998
NET-WORKS Computer City, Providence, RI 401-331-8450*24
ABBS Omaha, NE 402-339-7809
Dial-Your-Match #23 402-571-8942
TRADE-80 Omaha, NE 402-292-6184
Leithbridge Caming System, Leithbridge, AB 403-3206923
RCPI/M RBBBS Computron, Edmonton, Alberta, Can. 403-482-6854
RCPI/M RBBBS Edmonton, Alberta, Can. 404-654-6093*24
BBS IBM Hostcomm Atlanta, GA 404-252-4146
CBBS Atlanta Computer Society Atlanta, GA 404-636-6130
ITBBS Riverdale, GA 404-471-8824
NOCHANGE Atlanta, GA 404-587-4198*24
TIBBS Atlanta, GA 404-928-4278, 404-471-1283
TIBBS Ringgold, GA 404-935-4054
AMIS Oklahoma 405-681-6929
AMIS Oklahoma 405-685-2027
ARMU Oklahoma 405-722-5056
HBBS Oklahoma City, OK 405-848-9329*24
BBS IBM PC Billings, MT 406-656-9624
AMIS Grafex Cupertino, CA 408-253-5216
AMIS BBS San Jose, CA 408-298-6930
AMIS T.A.B.B.S. Sunnyvale, CA 408-942-6975

BULLET-80 San Jose, CA 408-241-0769
BYTE Bandits Club, TRS-80 BBS, San Jose, CA 408-374-3974
COMPUAT, Los Gatos, CA 408-353-1836
Dial-Your-Match #56 408-736-7356
NET-WORKS Computer Emporium, San Jose, CA 408-227-0227
PMS Campbell, CA 408-370-0873*24
PMS Santa Cruz, Aptos, CA 408-688-9629*24
RCPI/M Collosal Oxnate, San Jose, CA 408-263-2588
RCPI/M RBBBS Data Tech 004 Sunnyvale, CA 408-732-2433
RCPI/M RBBBS San Jose Oxnate, San Jose, CA 408-287-5901*24
RCPI/M Silicon Valley, CA 408-246-5014*24
CBM-U Commodore, Galveston, TX 409-763-0147
ARMU Pennsylvania 412-655-2652
CBBS PACC Pittsburgh, PA 412-822-7176*24
DBBS, Derry, PA (412) 694-5750
PACE, 412-754-0800, 24 hours, AMIS
AMIS Colorator Computer, WI 414-637-9990*24
AMIS Atari Wisconsin 414-352-2772
BBS SUE Milwaukee, WI 414-483-4578
Big Top Games System, Milwaukee, WI 414-259-9475
CBBS Maude Milwaukee, WI 414-241-8364*24
EXEC-PC IBM PC Milwaukee, WI 414-964-5160*24
PET BBS S.E.W.P.U.G. Racine, WI 414-554-9520*24
RCPI/M RBBBS Mike's, Milwaukee, WI 414-647-0903
TIBBS Milwaukee, WI 414-649-8316
TIBBS Appleton, WI 414-739-5380
TIBBS Freedom, WI 414-788-9730
TBBS Canopus, Milwaukee, WI 414-281-0545*24
VanMil, Milwaukee, WI 414-271-7580*24
AMIS Computerland, Fremont, CA 415-794-9314
ABBS Hayward, CA 415-881-5662
ABBS PCNET, San Francisco, CA 415-863-4703*24
ABBS South of Market, San Francisco, CA 415-469-8111
ARMU Synapse California 415-527-8276
BBS Living Videotext, Menlo Park, CA 415-327-8876*24
Blue BOSS IBM PC, Berkeley, CA 415-845-9462*24
CBBS Lambda, Berkeley, CA 415-658-2919
CBBS Proxima, Berkeley, CA 415-357-1130
CONFERENCE-TREE #3 Hayward, CA 415-538-3580
CONNECTION-80 Fremont, CA 415-651-4147*24
Dial-Your-Match -10 415-467-2588
Dial-Your-Match -17 415-991-4911
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PC - Blue Users Group Continued from page 147

over 3 months stalemated, the ACG-NJ started a pilot project for the internal ACG-NJ CPM Users Group. Hence, the Sig/M Users Group was born. I was the Board member of the ACG-NJ who piloted the project with Henry Kee, Bruce

Ratoff, Sol Libes and other members of the CPM community.

The philosophy of this group was to establish a new concept of the shared program library (as the CPMUG library attempted to do) but also expand its credibility with ALL CP/M users worldwide. Effectively, a new worldwide club exchange

system was created. New standards were implemented for documentation, user support, and for testing and releasing software donations into the Sig/M library for CP/M submitted software. As the name is defined, it's an archiving organization for club-exchanged software which is for non-commercial use by

club members. This became the defacto definition of Public Domain Software.

Direct support for the CP/M users community began initially and then in 1983 the IBM-PC came into being along with the PC-Blue Library. If the concept continues, you will probably see libraries for other operating systems as Apple DOS, Atari, Commodore or even TI or UNIX. These libraries are possible for those who wish to donate their efforts to the maintenance and control of those software libraries. The Sig/M Library is maintained by the ACG-NJ and the IBM-PC compatible library PC-Blue is maintained by the NTACC clubs. As libraries are created so will responsibilities.

Duplicity stood for a while as CPMUG and Sig/M became the Libraries of Public Domain Software. Even the CPMUG was granted distribution rights to copy the library in 1982 but they misused the right to include the first 25 volumes of the Sig/M Users Group library into their CPMUG library thus increasing their library suddenly from 54 to 77. Thus, the CPMUG gave the impression that the Sig/M groups had merged when in fact they NEVER had even looked to combine the CP/M type libraries.

As of mid 1983 the CPMUG group of NYC declared that their prices would increase to \$13 per volume of 8-inch software for CP/M Users. Their last volume was 092 and was released to the CP/M community. By April 1984, the Sig/M Users Group was up to Volume 172. The PC-Blue Users Group was up to 053.

Programs donated are submitted for non-commercial personal use of club members by the authors. It's a medium of exchanging ideas and refinement of a concept. Languages, utilities, systems for home or business and even club organizations. Here you will find the famous MODEM utilities, dBASE-II designs, Secretary system, FORTH and XLISP languages, Music Composition and even cross-assembly systems or even data translating utilities for vendor equipment to exchanging through a remote bulletin board are available.

These libraries are copyrighted by the ACG-NJ and NYACC computer clubs for non-commercial personal use through distribution to computer clubs. Thus, organizations other than clubs are not using the library in good faith. These libraries are created by clubs for their members' use and funds gained through these libraries are for continued club operation. The Libraries of Sig/M and PC-Blue are copyrighted by the ACG-NJ and NYACC clubs respectively.

Information is available for these program libraries by diskette or by hard copy.

Information diskettes of Public Domain Software is available as a dynamic release each time the library is updated....It's volume 000 of either the Sig/M or PC-Blue Libraries from the respective clubs or information mediums are outlined below.

Diskette libraries are:
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S. Bound Brook, NJ
USA 08880-0319

NYACC
P.O. Box 106
Church St. Station
New York, NJ
USA 10008-0106

or look for the JOIN.ACG or
JOIN.NYC membership files

in the diskette or Bulletin
Board system.

For information about the
compatible libraries or diskette
orders
CP/M type

Sig/M Users Group
P.O. Box 97
Iselin, NJ
USA 08830-0097

IBM-PC type

PC-Blue Users Group
P.O. Box 106
Church St. Station
New York, NY
USA 10006-0106

Or check your local club
newsletter, Bulletin Board
System magazine or Public In-
formation network.

Payments for:
Sig/M should be written
payable to Sig/M
PC-Blue should be written
payable to NYACC

Note all payments are tax
deductible to a non-profit club
strictly for its operation. No
members of these organizations
are paid and are strictly
volunteers for their respective
clubs.

Donations or submissions
can be made to the libraries
listed above. They should be
submitted with a Release
Form:
Sig/M SIG/M.LIB
PC-Blue PC-BLUE.LIB

For each accepted donation
to the library each author can
select a complementary copy of
any current volume of either
library.

Please send topics or ques-
tions to Sig/M Users Group or
the PC-Blue groups or send
SASE to

Bill Chin
P.O. Box 2085
Clifton, NY
USA 07015-2085

NOTE

PC-Blue disks are CP/M-80
software that run on IBM-PC
computers equipped with 8 bit
CP/M Cards (PC-Blue or
equal). They will not run
under MSDOS.

Newest releases from the PC-
Blue Users Group as of June 1,
1984

PC-BLUE Volumn 060:

Test sample programs of
Ten-Key and Media Magician
PC-Musician for those who like
computer music

PC-Blue Volume 060
Ten-Key (limited version)

Media Magician (limited
version)

PC-Musician

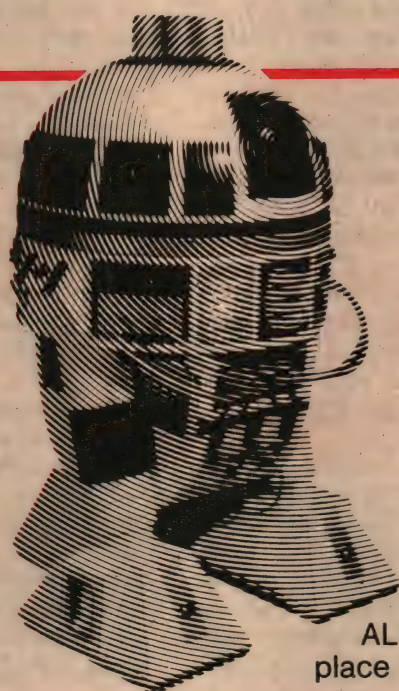
-Catalog.060 contents of PC-
Blue Volumn 060

CRCK4 .COM checksum
program

index	name	size	crc
060.01	READ-ME	2K	AA AD
060.02	DEMO	1K	CD 03
060.03	D1	20K	0B 1A
060.04	D2	37K	47 B2
060.05	TENKEY	23K	32 94
060.06	MNDEMO	12K	21 A7
060.07	MNDEMO	36K	DC A2
060.08	READ	2K	FA 50
060.09	AUTOEXEC.BAT	1K	4B C4
060.10	MAKEMONO.BAT	1K	B8 75
060.11	PRINTDOC.BAT	1K	BC 27
060.12	MAKECOPY.BAT	1K	EE F6
060.13	MUSICIAN.EXE	29K	B1 EA
060.14	TXTMUSIC.EXE	27K	0E 3B
060.15	EXNOTES	1K	A5 D2
060.16	MAKEG64	1K	1D A3
060.17	MAKEN64	1K	AB 84
060.18	CMUS64	27K	AE 3C
060.19	MUSICIAN.DOC	29K	31 73
060.20	YKEDODL.SNG	1K	57 42
060.21	JNCLEBL.SNG	1K	15 1F
060.22	TMUS64	26K	7B 86

PC-Blue Volume 059:
Update of the EPISTAT
statistical Package Release of
the PC-Compare Utility system
PC-Blue Volume 059
EPISTAT v3.0 Statistical
Package PC-Compare

Continued on page 151



THOUSANDS OF COMPUTERS AND OFFICE MACHINES ARE GATHERING AGAIN IN DENVER

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Show, you may save hundreds, even thousands of dollars because many of the products
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ROCKY MOUNTAIN COMPUTER SHOW AND SOFTWARE EXPOSITION

SHOW UP FOR THE SHOW

PC - Blue Users Group Continued from page 150

-CATALOG.059 contents of
PC-Blue Volume 059
CRCK4 .COM checksum
program

057.01	DOCUMENT.ONE	52K	BF 4D
(Ultra Utilities)			
057.02	DOCUMENT.TWO	16K	7D 52
057.03	U-FILE .EXE	58K	8D E1
057.04	U-FORMAT.EXE	37K	0D 0A
057.05	U-ZAP .EXE	61K	A8 C9
057.06	LU-MSDOS.DOC	7K	FE EB
(Library Update System)			
057.07	LU-MSDOS.EXE	22K	A7 CA
057.08	SQ .EXE	20K	D7 56
(Squeeze and Unsqueeze)			
057.09	USQ .EXE	27K	71 88
057.10	DSKRTN .DOC	1K	72 11
(Disk Utility)			
057.11	DSKRTN .EXE	10K	11 62

PC-Blue Volume 056:
Lotus 1-2-3 templates for con-
version and MACRO
generation
PC-Blue Volume 056
Utility 1-2-3 (templates for
Lotus 1-2-3)
-CATALOG.056 contents of
PC-Blue Volume 056
CRCK4 .COM checksum
program

056.01	ASCII .WKS	13K	49 25
(Utility 1-2-3)			
056.02	ASCIIDOC.BAT	1K	A4 9C
(utilities for Lotus 1-2-3)			
056.03	ASCIIDOC.PRN	4K	75 4A
056.04	ASCIITUT.WKS	80K	32 6A
056.05	AUTO123 .WKS	19K	2D A2
056.06	END .PRN	1K	D8 ED
056.07	HINTSTUT.WKS	11K	9D 66
056.08	INTROTUT.WKS	41K	37 A6
056.09	LOTUS .PRO	5K	96 16
056.10	MACROTUT.WKS	11K	F6 5B
056.11	PRINTER .WKS	10K	04 4D
056.12	PRINTTUT.WKS	38K	H6 4D
056.13	PROXYTUT.WKS	24K	17 A1
056.14	README .BAT	1K	88 10
056.15	SCREEN1 .PRN	2K	A7 B8
056.16	SCREEN2 .PRN	2K	DA 95
056.17	SCREEN3 .PRN	2K	BA 7C
056.18	SCREEN4 .PRN	2K	CF F8
056.19	SETUP .BAT	1K	74 ED
056.20	123RANGE.BAS	9K	78 F5

PC-Blue Volume 054 and 055:
FORTH language for your use
PC-Blue Volume 055
FIG-Forth (Volume 2 of 2)
-CATALOG.055 contents of
PC-Blue Volume 055
CRCK4 .COM checksum
program

FIG-Forth			
055.01	4TH-MAIN.ASM	49K	8A B0
055.02	EDITOR .SCR	7K	51 51
055.03	CODE .SCR	5K	E8 B9
055.04	MESSAGES.SCR	2K	54 85
055.05	STRINGS .SCR	7K	EA 5A
055.06	FIGED .SCR	6K	F4 9E
055.07	RANDOM .SCR	2K	BC 3F
055.08	TRIG .SCR	3K	7B 8B
055.09	LIFE .SCR	5K	0A 87
055.10	ARRAYS .SCR	2K	47 A2
055.11	SIEVE .SCR	3K	4C 00
055.12	TIME .SCR	4K	4F F9
055.13	GR .SCR	12K	C7 61
055.14	BREAK4TH.SCR	8K	37 2B
055.15	GLOSSARY.	15K	28 8A

PC-Blue Volume 054
FIG-Forth (Volume 1 of 2)
-CATALOG.054 contents of
PC-Blue Volume 054
CRCK4 .COM checksum
program
PC-Blue Volume 053:
PC-Dial Communications
Utility
PC-Write Word Processing
System
Note the document file has

Volume 053 continued			
FIG-Forth			
054.01	README .	4K	4B 35
054.02	FORTH .COM	14K	FB CC
054.03	4TH .COM	8K	FA 05
054.04	PCFORTH .COM	14K	F8 1C
054.05	ASM .SCR	42K	H2 36
054.06	FUTIL .SCR	11K	08 A8
054.07	UTIL .SCR	9K	B7 HA
054.08	SCREENED.SCR	34K	1F 54
054.09	CASE .SCR	2K	61 7F
054.10	FILES .SCR	20K	AA 94
054.11	4TH-UC .DOC	93K	AO 8C
054.12	4TH-UC .TOC	5K	5D 16
054.13	4TH-DISK.ASM	4K	C6 91
054.14	4TH-FILE.ASM	5K	7F E6
054.15	4TH-SYSD.ASM	5K	DA 45
054.16	4TH-XTNS.ASM	5K	57 2B
054.17	4TH-LIB .MAC	4K	CF CA
054.18	MAKGL .BAT	1K	92 9D
054.19	SORTGL .BAT	1K	C5 1F
054.20	MAKE4TH .BAT	1K	E7 8C
054.21	4TH-OPTS.H	1K	54 55
054.22	4TH-XTNS.IBM	6K	1F 9C
054.23	4TH-OPTS.IBM	1K	76 EE

been squeezed use USQ.COM
or USQ.EXE
PC-Blue Volume 053
PC-Dial (Comm), PC-Write
(WP)

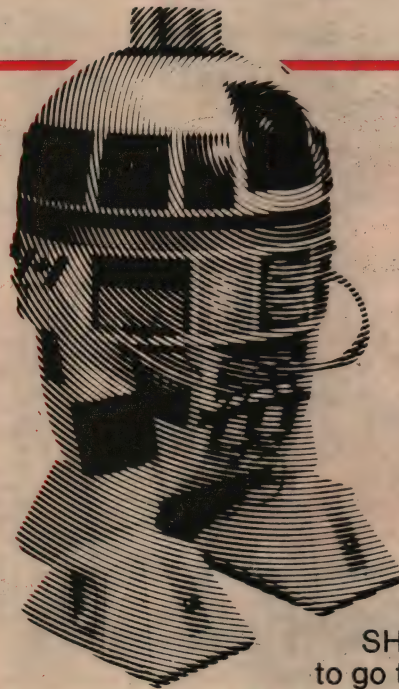
Continued on page 152

EPISTAT - Statistical Package			
059.01	EPIMRG .BAS	3K	6D 8C
059.02	EPISTAT .BAS	11K	04 6B
059.03	DATA-ONE.BAS	8K	1D 65
059.04	ANOVA .BAS	6K	8B AB
059.05	BAYES .BAS	4K	88 53
059.06	BINOMIAL.BAS	3K	BD 14
059.07	CHISQ .BAS	4K	F9 05
059.08	CORRELAT.BAS	4K	36 1C
059.09	FILETRAN.BAS	4K	9A 8D
059.10	FISHERS .BAS	2K	39 1B
059.11	FORTTRANS.BAS	3K	2E 75
059.12	HISTOGRAM.BAS	5K	43 B2
059.13	LNREGRES.BAS	5K	34 78
059.14	MCHISQ .BAS	2K	D2 3A
059.15	MCHIMLT.BAS	3K	CE 16
059.16	MCMEMAR .BAS	2K	EA 9E
059.17	NORMAL .BAS	4K	DC CB
059.18	POISSON .BAS	2K	3F B4
059.19	RANDOMIZ.BAS	4K	6A 5E
059.20	RANKTEST.BAS	7K	F3 FB
059.21	RATEADJ .BAS	3K	7D CC
059.22	SAMPLESIZ.BAS	4K	7A E0
059.23	SCATGRAM.BAS	6K	36 34
059.24	SELECT .BAS	7K	20 DD
059.25	T-TEST .BAS	4K	2C 46
059.26	XTAB .BAS	5K	EE DD
059.27	PRINTDOC.	24K	9B E7
059.28	EPISSETUP.DAT	1K	C0 85
059.29	RUN .BAT	2K	C6 B0
(PC-Compare)			
059.30	COMPARE1.DOC	2K	A1 72
059.31	COMPARE2.DOC	2K	AF 63
059.32	COMPARE3.DOC	2K	A7 FA
059.33	COMPARE4.DOC	2K	C1 46
059.34	COMPLETE.DOC	9K	12 6A
059.35	COMPARE .COM	42K	96 6C
059.36	PRINTDOC.BAT	1K	E1 DF
059.37	SAMP1 .TXT	2K	FO AE
059.38	SAMP2 .TXT	2K	68 F5
059.39	COPYCOMP.BAT	1K	A4 93
059.40	CLS .COM	1K	C1 C0
059.41	FILES .LST	1K	ED 39

PC-Blue Volume 058:
Ever want to know where you
are in the Family Tree...
Try these programs...
PC-Blue Volume 058
Genealogical System
-CATALOG.058 contents of
PC-Blue 58
CRCK4 .COM checksum
program

Genealogical Programs			
058.01	CREATPER.BAS	4K	BB 57
058.02	CREATMAR.BAS	3K	67 B2
058.03	CREATORD.BAS	4K	56 57
058.04	UPDATPER.BAS	11K	C3 64
058.05	UPDATMAR.BAS	7K	0C 60
058.06	UPDATORD.BAS	13K	40 10
058.07	INDEXPC .BAS	5K	00 85
058.08	INDEXMAR.BAS	5K	8A F3
058.09	PRINTPER.BAS	6K	7E AF
058.10	PRINTMAR.BAS	5K	69 2B
058.11	LISTPER .BAS	4K	6A A4
058.12	LISTMAR .BAS	5K	56 46
058.13	LISTPCI .BAS	4K	A7 AD
058.14	ALPHAPER.BAS	6K	B2 10
058.15	ALPHAMAR.BAS	5K	02 E4
058.16	DISPLAY .BAS	21K	C8 01
058.17	PEDIGREE.BAS	19K	B7 DE
058.18	FAMILY .BAS	17K	0D 53
058.19	DIRECTOR.BAS	14K	3F EA
058.20	TABLEOFC.BAS	11K	1F DC
058.21	INTRODUC.BAS	13K	A1 EC
058.22	GENERAL .BAS	18K	96 39
058.23	USINGTHE.BAS	23K	00 FF
058.24	REFERENC.BAS	14K	96 E3
058.25	APPENDIX.BAS	28K	86 B9

PC-Blue Volume 057:
Ever want utilities as existed in
the CP/M environment...well
YOUR wish has been
GRANTED (at least partially)
SQ and USQ as well as DU...
try them if you are out of space
or accessing RBBS/ CBBS/
ABBS's or any networks as
Source or Compuserve.
PC-Blue Volume 057
Ultra Utilities, Squeeze/Un-
squeeze Library Update
System, Disk Utility
-CATALOG.057 contents of
PC-Blue Volume 057
CRCK4 .COM checksum
program



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SHOW UP FOR THE SHOW

**MID-ATLANTIC
COMPUTER SHOW
AND
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EXPOSITION**

PC - Blue Users Group
Continued from page 151
-CATALOG.053 contents of
PC-Blue Volume 053
CRCK4 .COM checksum
program

053.01	PC-DIAL .DOC	27K	02	48
(PC-Dial (Comm))				
053.02	PC-DIAL .COM	38K	22	2E
053.03	PC-DIAL .PRG	1K	8F	4E
053.04	PC-DIAL .DOC	30K	5E	50
053.05	PAGE .COM	1K	02	18
053.06	DOC .COM	16K	01	00
053.07	MANUAL .CRN	66K	AD	28
(PC-Write (WP))				
053.08	EXPAND .COM	1K	C9	CB
053.09	ED .EXE	27K	1A	08
053.10	PR .EXE	9K	3D	33
053.11	RULER .DEF	1K	20	E7
053.12	RULERW .DEF	1K	9A	84
053.13	RULERG .DEF	1K	1A	04
053.14	REGFORM .DOC	3K	8A	61
053.15	READ .ME	2K	92	22
053.16	AUTOEXEC.BAT	1K	C3	34

Membership and information
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Sig/M Users Group
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or

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INFORMATION:

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PC-Blue Volume 000
diskette cost (\$6/\$9)

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PC-Blue Users Group

Sig/M Users Group

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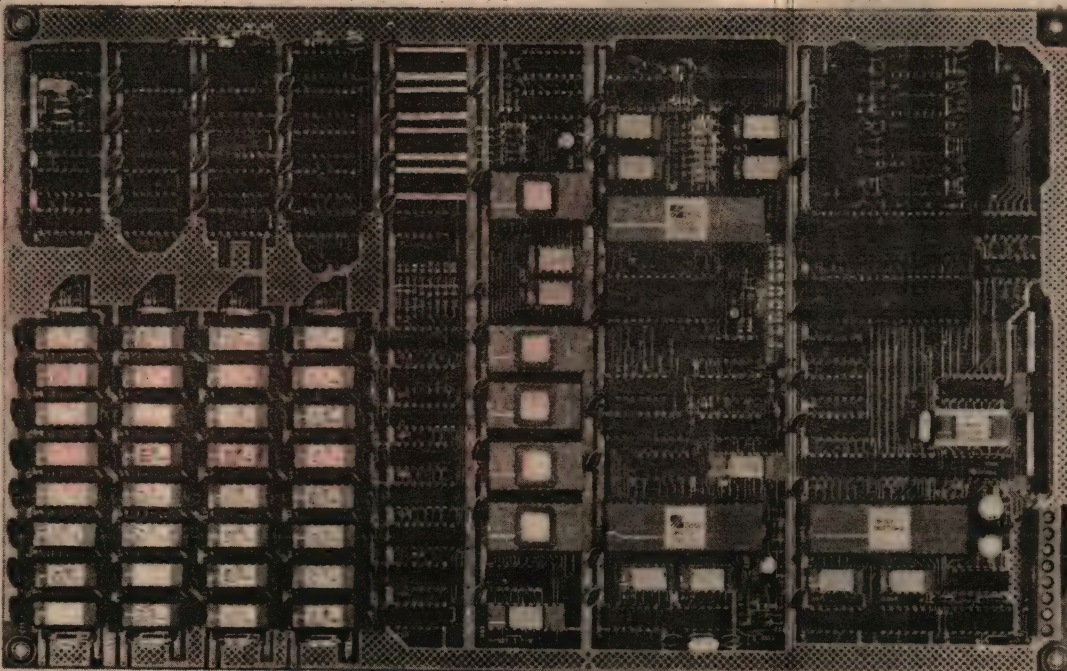
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Running at 2.5 MHZ. Handles all 4116 RAM refresh and supports Mode 2 INTERRUPTS. Fully buffered and runs 8080 software.

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PFM 3.3 2K SYSTEM MONITOR

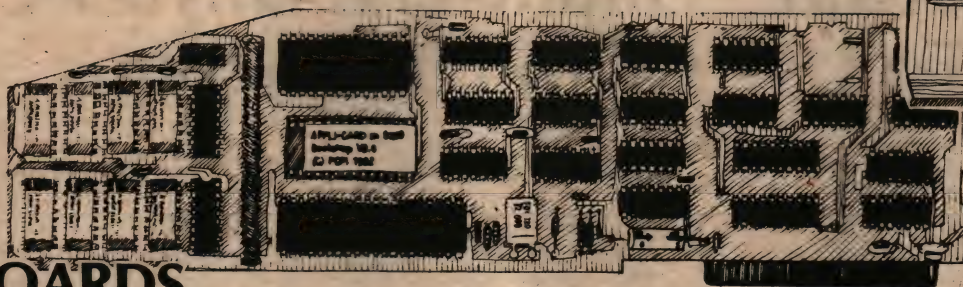
The real power of the Big Board lies in its PFM 3.3 on board monitor. PFM commands include: Dump Memory, Boot CP/M*, Copy, Examine, Fill Memory, Test Memory, Go To, Read and Write I/O Ports, Disc Read (Drive, Track, Sector), and Search PFM occupies one of the four 2716 EPROM locations provided. Z-80 is a Trademark of Zilog.

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"Find a computer that will outperform ours, and we'll give you a HeadStart™ free."

That's the challenge that Intertec, manufacturer of business microcomputers, presented to the public at the National Computer Conference (NCC) in Las Vegas, Nev. July 9-12. Open to one and all, the bold campaign challenges everyone to find a

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A portable version is also available. Featuring a snap-on faceplate which houses a smaller keyboard, cable and diskettes, the portable version was available for public viewing for the first time at NCC.

Information on contest rules will be available by calling In-

tertec Corporate Headquarters in Columbia, S.C. (803/798-9100).

Whether the challenge is won or lost, participants still have a chance to win a HeadStart in a Second Chance Giveaway. A random drawing will be held after the contest closes Sept. 30, 1984. Second Chance Giveaway entry forms will be available at participating dealers' locations.

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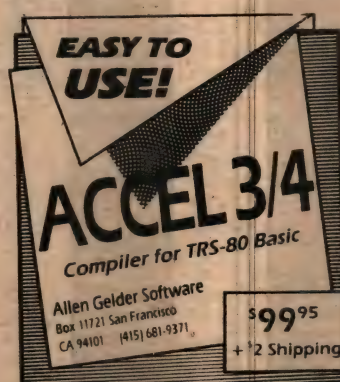


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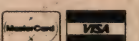
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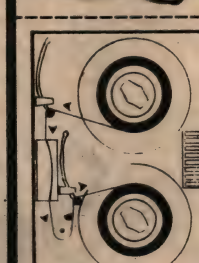
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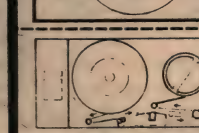
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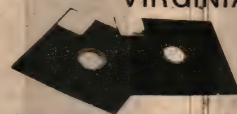
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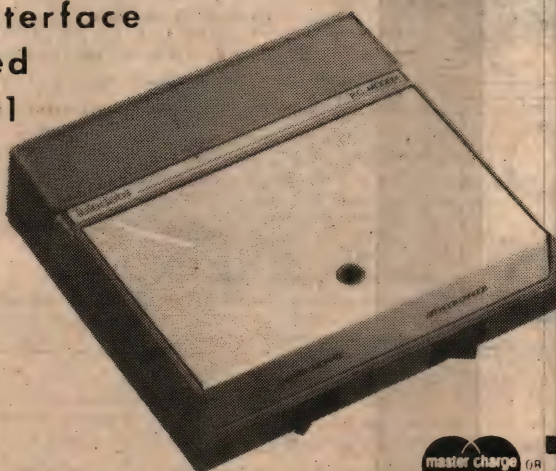
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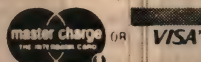
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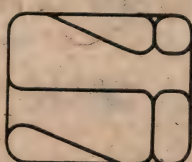
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CAI Computer Aided Instr.	UTL UTILITY/OTHER	TAX Tax Packages
GRA Graphics	CAT EXTENSIVE CATALOG	W/P Word Processing
HOM Home Economics	OTH OTHER PROGRAMS AND SOFTWARE	
PER Personal + Recreation	CUS CUSTOMIZED S/WARE	
	BUSINESS	INDUSTRIAL
• CODE	• CODE	• CODE
ASM Assembler	ANA Business Analysis	BWL Bowling League Sec.
BAS BASIC Language	A/P Accounts Payable	CPA Cert. Public Accounting
COB Cobol Language	A/R Accounts Receivable	DEN Dental
CST Cassette Program	BUS General Bus./Other	ENG Engineering
DBM Data Base Manager	CAS Cash Register	FIN Financial
EDT Editor	G/L General Ledger	INS Insurance
FOR FORTRAN Language	INV Inventory	LAW Legal
FTH Forth Language	JOB Job Costing	MED Medical
LNG Other Languages	MAI Mailing List	PTR Prof. Time Reporter
O/S Operating System	OMG Osborne/McGraw-Hill Business Pkg.	REA Real Estate
PAS Pascal Language		SAL Sales Analysis
RPT Report Writer		STA Statistics
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Silicon Salad	25	21
Tip Disc #1	20	15
Utility City	30	22
EINSTEIN		
Applesoft Compiler	129	84
HAYES		
Smartcom 1	120	85
INSOFT		
GrafFORTH by Paul Lutus	75	55
TransFORTH	125	85
MICROSOFT		
AL D.S. (req. Z-80)	125	85
FORTRAN 80 (req. Z-80)	195	133
PENQUIN		
Graphics Magician	50	35
Complete Graphics System	80	52
PHOENIX		
Zoom Graphix	50	33
QUALITY		
Bag of Tricks	40	27
TERRAPIN		
Logo	100	70

HOME

ATARI		
Joust, Moon Patrol, Pole Position, Donkey Kong	35	26
AVALON HILL		
Telengard	28	19
BEAGLE BROS.		
Beagle Bag	30	21
BLUECHIP		
Millionaire or Tycoon	60	39
BRODERUND		
Arcade Machine	60	39
Apple Panic	30	20
Choplifter or Loderunner	30	20
BUDGEBO		
Pinball Construction Set	40	25
CONTINENTAL		
Home Accountant	75	49
DATASOFT		
Zaxxon	40	26
EPYX		
Temple of Apshai	40	30
Summer Games	40	30
HAYDEN		
Sargon II	35	25
Sargon III	50	33
INFOCOM		
Sorcerer or Suspended	50	33
Enchanter	50	33
MICRO LAB		
Miner 2049	40	26
ORIGIN		
Ultima III	60	39
SIERRA/ON-LINE		
Ultima II	60	39
Frogger	35	23
SIR-TECH		
Wizardry	50	35
Knight of Diamonds	35	28
STRATEGIC SIMULATIONS		
Battle of Normandy	40	34
Geopolitique 1990	40	26
SUBLOGIC		
Flight Simulator II	50	36
"Nightmission" Pinball	35	25

COMMODORE 64

BUSINESS

	List Price	Our Price
BATTERIES INCLUDED		
Paper Clip w/Spell Pack	\$120	\$ 78
Consultant	100	69
COMMODORE		
General Ledger	46	31
Accounts Receivable	46	31
CONTINENTAL		
FCM (File, Catalog, Mail)	50	33
HESWARE		
Multiplan	100	45
MUSE SOFTWARE		
Supertext Professional	99	65
SIERRA ON-LINE		
Homework Speller	50	35
TIMEWORKS		
AP, AR, GL, INV.	60	40

UTILITY

ADVENTURE INTERNATIONAL		
Diskey	50	25
COMMODORE		
Simon's Basic	21	16
Logo	69	44
HESWARE		
64-FORTH	60	42
6502 pro Dev. System	30	22
Hesmon	40	28
Synthesound 64	20	14
MICRO SOFTWARE		
Doctor	30	20
SOUTHWESTERN DATA SYS		
Merlin 64	50	35

HOME

ACADEMY SOFTWARE		
IFR (Flight Simulator)	30	22
ACCESS S/W		
Beach Head	35	23
ATARI		
Joust, Moon Patrol, Pole Position, ea.	45	33
AVALON HILL		
Moon Patrol	25	18
BRODERUND		
Lode Runner (cart.)	40	27
Bank St. Writer	70	47
COMMODORE		
Intl Soccer (Cart.)	35	24
CONTINENTAL		
Home Accountant	75	50
DATAMOST		
Aztec	40	27
EPYX		
Fax	30	22
Dragon Riders of Pern	40	27
Summer Games	40	27
GAMESTAR		
Star League Baseball	30	21
MUSE		
Castle Wolfenstein	30	22
ORIGIN		
Ultima II (Exodus)	60	40
PARKER BROS.		
Star Wars	50	35
Popeye (Cart.)	50	33
QUICKTEX		
Quick Brown Fox	50	33
SEGA		
Star Trek, Zaxxon	40	27
SIERRA ON-LINE		
Quest for Tires (Cart.)	35	23
Ultima II (disc)	60	40
STRATEGIC SIMULATIONS		
Battle for Normandy	40	30
TRONIX		
S.A.M. (disc speech synthesizer)	60	42

IBM PC

BUSINESS

ASHTON TATE		
dBase II		Call
ASK MICRO (ACCOUNTING PLUS)		
AP, AR, GL, PR, PO, SO (PC-DOS) ea.	\$595	355
ALPHA		
Database Manager	295	185
APPLIED SOFT TECH		
Check Writer	40	27
Versaform	389	252
BPI SYSTEMS		
AP, AR, GA, PR ea.	595	395
General Acct.	595	357
CHANG LABS		
Micro Plan	495	325
CONTINENTAL		
Home Accountant/Tax Adv. Combo	220	142
FOX & GELLER		
Quick Code, Grafox, dGraph	295	192
dUtil (MS-DOS)	200	130
HARVARD SOFTWARE		
Harvard Product Manager II	395	237
HAYDEN		
Pie Writer	200	130
Pie Speller, Sargon III	50	33
HOWARD SOFTWARE		
Tax Preparer 1984	295	185
HUMAN EDGE		
Management, Negotiation	250	170
Sales, ea.		
IUS		
Easy Writer II System	395	255
AP, AR, GL, INV. OE	595	385
INSOFT		
Data Design (128k + 2 disc)	225	155
LIFETREE		
Volkswriter 1.2	195	130
Volkswriter Deluxe	295	192
LIVING VIDEOTEXT		
ThinkTank	195	117
MICROIM		
R-base Series 4000 (256k)	495	325
R-base Clout		
R-base Ext. Report Writer	150	90
MICROSOFT		
Budget	150	95

	List Price	Our Price
Financial Statement	100	65
Word (PC-DOS)	395	245
Word w/Mouse	495	310
Multiplan (MS-DOS)	195	130
Cash Plan	125	82
MONOGRAM		
Dollars & Sense	\$165	\$107
MULTIMATE INTERNATIONAL		
Multimate	495	297
OPEN SYSTEMS		
AP, AR, GL, INV, PR, PO, SO	695	415
PEACHTREE		
Series 4-PeachPak (GL/AR/AP)	395	229
Peachtext 5000 (MS/DOS)	395	229
PEARLSOFT		
Personal Pearl	295	192
PERFECT		
Perfect Library (w/s/t/c)	699	455
SATELLITE		
WordPerfect (128k)	495	247
SELECT INFORMATION		
Select Write w/Teach	99	70
SOFTWARE ARTS		
Tk Solver	399	265
SOFTWARE PUBLISHING		
PFS: File, PFS, Write, ea.	140	92
PFS: Report	125	82
PFS: Proof	95	65
PFS: Graph	140	84
SOFTWARE SYS		
Multimate	495	300
SORCIM		
SuperWriter, SuperCalc 2 ea.	295	192
SuperCalc 3	395	255
STONEWARE		
Adv. DB Master	595	390
DB Master	595	357
VISICORP		
Desktop Plan 1	300	200
VisiCalc 4	250	165
VisiFile Ver. 3.0	300	200
VisiWord +	375	245

UTILITY

DIGITAL RESEARCH		
Concurrent CP/M-86 windows	350	250
CP/M-86	60	39
Access mngr.	400	265
CBASIC 86	200	130
Pascal/MT + CP/M-86	400	262
Pascal/MT + (PC/DOS)	600	393
PL/1	750	489
Speed Prog. Pkg. (CP/M-86)	200	132
FUNK SOFTWARE		
Sideways	60	39
INSOFT		
GrafFORTH (3ds animated graphics)	125	88
MICROSOFT		
Business BASIC Comp.	600	375
COBOL Comp.	700	470
FORTRAN Comp.	350	235
PASCAL Comp.	300	200
Macro Assembler	100	75
C Comp.	500	330
Cross Talk XVI	195	132
ROSESOFT		
Prokey	130	85

HOME

ATARI		
Joust, Moon Patrol, Ms. Pac Man ea.	35	25
ARMONDE		
Executive Suite	40	26
BLUE CHIP		
Millionaire, Baron, Tycoon, ea.	60	39
BPI SYSTEMS		
Personal Accounting	99	70
BRODERUND		
Apple Panic	30	19
Lode Runner, Serpentine, ea.	35	23
EPYX		
Temple of Apshai	40	27
Summer Games	40	27
INFOCOM		
Sorcerer, Deadline, Suspended, ea.	50	32
Zork I, II, III ea.	40	26
INSOFT		
Mystrix, Quotrix, Wordtrix, ea.	35	25
MICROLAB		
Miner 2049	40	26
MICROSOFT		
Flight Simulator	50	33
ORIGIN		
Ultima III	60	39
SOFTWARE SYS		
Multimate	495	293
SPINNAKER		
Snooper Troops 1 or 2 ea.	45	30
STRATEGIC		
Battle of Normandy	40	28

ORDERING INFORMATION

TERMS AND INFO: Cashier's Checks, Money Orders, Fortune 1000 or Government Checks honored immediately. Personal Checks held for clearance. Include phone # and driver's license number on checks. Above prices reflect cash discount so add 4% for VISA or Master Card. Add 3% (15 min.) for UPS delivery 12% (\$15 min.) for U.S. Mail. Call for foreign shipping charges. *Prices subject to change without notice. All items are new, guaranteed to work, and include manufacturer's warranty, therefore **ALL SALES ARE FINAL**. Call for instructions before returning items for repair or replacement. All Manufacturer's Trademarks Apply. *Orders with insufficient shipping and handling charges will be refunded. Our Bank is The Central Bank of the South, Huntsville, AL 35805 (205) 533-6262

CALL: 1-205-535-6700
24 HRS. 7 DAYS A WEEK

HARDWARE

APPLE

	List Price	Our Price
ALS		
CP/M card with CP/M Plus	\$400	\$280
Smartterm II	179	135
Z-Card II	170	110
CHALKBOARD		
Power Pad (req. kit)	100	70
KENSINGTON		
System Saver	90	65
KOALA		
Koala Pad w/Micro Illustrator	125	88
KRAFT		
Joystick	50	33
LKJ		
Lower Case Char. Generator	25	16
MICROSOFT		
Softcard II	450	315
PERSONAL COMPUTER PRODUCTS		
8088 Coprocessor Bd	595	415
WICO		
Trackball	90	58

COMMODORE 64

CHALKBOARD		
Power Pad Prog. Kit	\$ 25	\$ 17
DATA 20		
Z-80 Video Pak	300	210
KOALA		
Koala Pad w/Koala Printer	100	70
OMICRON SOFTWARE		
Commodore 64/VIC 20 Cover	8	5

(113) COMMODORE COMPUTERS FOR SALE



COMMODORE UPGRADE

MSD-SD2 Dual Disk Drive \$550. Trade in your 1541's and save even more! Juki 6100 Letter Quality Printers only \$447. Also: Used Commodore-64 hardware for sale! All guaranteed! **Shreve Systems**, 845 Lark, Siport, LA 71105. 318-865-6743. 9-57

FOR SALE— Used Commodores. The Used Computer Brokerage: call TOLL FREE 1-800-821-5226, ext. 104.

POWER SUPPLIES We have a number of Commodore 64 power supplies for sale for \$35 delivered, COD. Call or write: **Godfather's Used Computer Syndicate**, P.O. Box 3037, 1154 W. SR 434, Forest City, FL 32714. 305-774-1000.

(113A) COMMODORE COMPUTERS WANTED

WANTED - VIC-20 COM-64 and accessories, working or not. Send price and condition to **Photo Trix**, 136 Fifth Ave., Pelham, NY 10803. 8-58

COMMODORE FETISH! I want Commodore home computers & misc. computer equipment. 318-865-6743. **Shreve Systems**. Also, see ad previous classification. 9-57

SEND US your complete Commodore 64, we will send you \$100, no power supply? Deduct \$20. Call or write: **Godfather's Used Computer Syndicate**, P.O. Box 3037, 1154 W. SR 434, Forest City, FL 32714. 305-774-1000.

WANTED FOR DOS experiments: non-working 1541 disk drives. Will pay \$60 each with box and cable. **Dr. J. Levine**, Rt. 2 Box 302-P, Lynchburg, VA 24501.

WANTED— Used Commodores. We will advertise your item nationally. The Used Computer Brokerage: call TOLL FREE 1-800-821-5226 ext. 104.

(113B) COMMODORE SOFTWARE, PERIPH.



TEN \$ WILL GET YOU FIVE TWENTY \$ WILL GET YOU TEN

Word Processing, Mailing List Data base, Machine Language Utilities and Games, Lottery, Satisfaction or we will return your money. To join our national 64/20 library send \$10 or \$20 to: **PGA - P.O. Box 2632**, New York, NY 10009. You will receive FIVE or TEN of our best programs you could imagine. List for \$2, refundable on your first order. **BEGINNER PAMPHLET**, Tricks Of The Trade \$3. Members **FREE**. 212-420-0953 **ARNIS**. 8-57

LIFE. A true classic for the Commodore 64. Written in machine code for quick screen updates. Disc only \$10 postpaid. **FTW Products**, 154 S. Hedges St., Dayton, OH 45403. 8-60



THE BOOTMAKER will write to disk a machine language boot that will LOAD and RUN the BASIC or ML program you name. It will save keystrokes and cut typing errors. When THE BOOTMAKER is done, you simply type LOAD""""8,1 and watch the magic. For the C64 and 1541 drive. Send \$25 plus \$2 shipping and handling to **UNIBLAC SOFTWARE**, PO Box 633, Bellevue, NE 68005. 8-56

FREE CATALOG!

Complete line of home, educational, and business software for VIC-20 and C-64. **Farthest Fringe S.A.**, 101 Highway Blvd., N. Pekin, IL 61554. 4-56

★ ★ ★
COMMODORE 64 P.D. Software on Cassette - only \$6.95 ea. plus \$2 shipping. Games I (14 programs) - Math I, II, III & IV Business (14 programs) - Technology (10 programs) - Geography (13 programs) - History (5 programs) - English I (14 programs) and Monopoly. Top quality computer cassettes C-12's @ 75 cents each, 10 for \$6. Labels included. Boxes 15 cents each. Free flyer available from: **Software House**, 2071 Emerson St. #20, Jacksonville, Florida 32207. 904-399-0424. Dealer inquiries invited. 7-56



★ ★ ★
COMMODORE 64 and **VIC-20** owners! Personalized and regular programs at new low prices! Many to choose from, priced as low as \$3. Write today for free catalog! **Britton**, 8703 SE Jardin St., Hobe Sound, FL 33455. 5-59

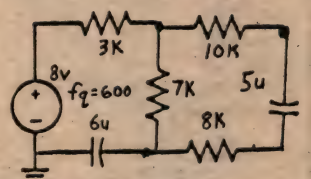
★ ★ ★
TRADE IN YOUR VIC/64 SOFTWARE and books for new or used—it's better than renting! Send \$1 (refundable with order) for catalog. Specify computer & model. **The Great American Software Exchange**, Dept. CS, P.O. Box 1548, Springfield, VA 22151. 8-59



★ ★ ★
25 VIC-20 programs on cassette \$5.95. 20 Commodore 64 programs on disk or cassette \$5.95. For free info write: **SOFTWARE**, 234 87th Place South, Birmingham, AL 35206. 205-836-3395. 8-57

VIC-20 CASSETTE ADAPTER. Allows you to use your own cassette recorder with your Vic-20. Just plugs right into your computer and cassette recorder. Send \$23.70, or write for more information. **Mark Christensen**, 407 North Ninth West, Provo, Utah 84601. 8-56

COMPUTER-AIDED stock market decisions. It's time you put your computer to work for you. Five stockmarket programs to aid stock selection and buy/sell decisions on C64 diskette. Send \$29.95 to **S.M. Decisions**, Box 362, Dublin, PA 18917. 8-57



ELECTRONICS AC DC Circuit Analysis Commodore-64 (Vic-20 8K) Computes numerical solution to electronic circuits containing 63 branches 40 nodes (Vic-20 25 branches 11 nodes). Branches of RLC Voltage, current sources, or controlled sources. Computer displays voltages; branch voltages, current, powers. Disk \$26.95, Cassette \$18.95. **Computer Heroes**, 1961 Dunn, Liverpool, Ohio 43920. 8-56

VIC-20 COMPUTER games, 30 full color action games on cassette tape, all run in standard Vic memory, only \$10 for all 30, or 12 educational programs on cassette, only \$10 for all 12. **Frederick Schepher**, -8347 Dock Road, Pasadena, MD 21122. 1-301-437-5334. 7-56



★ ★ ★
FREE SOFTWARE Public domain software for VIC-20 and Commodore 64 computers. For info send \$1 to:

UNITED STATES COMMODORE USER GROUP, P.O. Box 2310, Roseburg, OR 97470. 6-56

Coming Events

If you know of or have a trade show, swap meet or club meeting connected with the computer field, we'll run an announcement in the **COMING EVENTS** section **FREE** of charge.

AUGUST 1984

AUGUST 20-24, 1984
Short Course in Pascal will be offered by Ohio State University. For more information, contact Louise Larew, Office of Continuing Education, 2400 Olentangy River Road, Columbus, Ohio 614-422-8571

AUGUST 21-22, 1984
Indycon 84 will be held in Indianapolis, IN with over 200 exhibitors. For more information, contact ERA KY/IN Chapter 317-875-7711

AUGUST 25, 1984
The New York Amateur Computer Club's Quarterly Computer Show and Flea Market will take place from 10am-6pm in St. Anthony's Church at Sullivan & Houston Streets in Greenwich Village, NYC. General admission \$2.50. For more information, call Don Johnson 212-732-2565

AUGUST 25-26, 1984
Computer SELL-A-RAMA will be held in Cincinnati, Ohio at 68 Shadybrook Armory. Buy & Sell computer hardware, software, peripherals, video equipment & games. Held jointly with Ohio Camera Swap. One admission for both events. Reserve tables early - call or write: Bill Bond, 8910 Cherry, Blue Ash, Ohio 45242 - 513-891-5266 or Ken Lewis 513-851-9872.

AUGUST 26, 1984
The Central Pennsylvania Repeater Association Inc., 11th Annual Hamfest/Computerfest.

To be held adjacent to Hersheypark, Chocolate town, USA, Hershey, PA. For more information contact Barrie L. Schwartz, W3ENL, Hamfest Secretary, 3545 September Drive, Camp Hill, PA 17011, (717) 763-8728.

AUGUST 27-30, 1984
Workshop in Ada sponsored by Georgia Institute of Technology. Course fee \$900. Team discount available. For more information, call Elaine Hadden Nicholas 404-894-2547

SEPTEMBER 1984

SEPTEMBER 5-7, 1984
The National Software Show West will be held in Anaheim, CA. Over 400 exhibitors and 1000 booths will be present at the show. For more information, contact Raging Bear Productions, Inc. 415-924-1194

SEPTEMBER 6-9, 1984
The San Francisco Computer Showcase Expo expects 6,800 attendance and will showcase 150 exhibitors and 200 booths. For more information, contact The Interface Group, Inc. 617-449-6600

SEPTEMBER 7-8, 1984
HAM-O-RAMA
To be held at the Erie County Fairgrounds (Buffalo Raceway), Hamburg, NY. For more information write L.J. Keller, Vendor Chairman, Bowen Road, P.O. Box 6, Elma, NY 14059

SEPTEMBER 11-14, 1984
Unix Systems Expo/84 to be held in Los Angeles Convention Center. 200 companies exhibiting in 500 booths. For more information, contact Computer Faire, Inc. 617-965-8350

SEPTEMBER 12-14, 1984
Introductory course in Data Communications will be sponsored by Georgia Institute of Technology. For more information, contact Elaine Hadden Nicholas 404-894-2547

SEPTEMBER 12-14, 1984
The Software Expo will be held in Chicago, IL. For more information, contact PEMCO 312-299-3131

SEPTEMBER 13-14, 1984
Marketing of Microbased Software Course will be sponsored by Georgia Institute of Technology. For more information, call Elaine Hadden Nicholas 404-894-2547

SEPTEMBER 13-16, 1984
Detroit Computer Showcase will attract over 150 exhibitors and expects an attendance of 6,600. For more information, contact The Interface Group, Inc. 617-449-6600

SEPTEMBER 14-16, 1984
The Heart of Texas Computer Show. Scheduled to run 3 days at the Bayfront Plaza in Corpus Christi, TX. For more information write Heart of Texas Computer Show, P.O. Box 12094, San Antonio, TX 78212 or call (512)681-2248.

SEPTEMBER 15-16, 1984
The 10th New Jersey Microcomputer Show will take place from 10am-5pm at the Meadowlands Hilton (near Giants Stadium). Admission: adults \$5, children \$3. Over 250 exhibitors. For more information, call Ken Gordon Productions 201-297-2526

SEPTEMBER 20-21, 1984
Software for Project Management and Estimating will be presented in Los Angeles, Ca. For more information, contact CIP Information Services, Inc., 1105-F Spring Street, Silver Spring, MD 20910; 301-589-7933.

SEPTEMBER 20-23, 1984
Userfest/New York
To be held at Madison Square Garden in New York. For more information write or call Northeast Expositions, 822 Boylston Street, Chestnut Hill, MA 02167, (617)739-2000.

SEPTEMBER 20-23, 1984
Tampa Computer Showcase Expo to offer over 200 booths and an expected attendance of 15,000. For more information, call The Interface Group, Inc. 617-449-6600

SEPTEMBER 20-23, 1984
The Personal Computer Userfest to be held in NYC, NY with over 400 exhibitors. For more information, contact Northeast Expositions 617-739-2000

SEPTEMBER 24-26, 1984
PCExpo to be held in Anaheim, CA with over 520 booths. For more information, contact PCExpo 201-569-8542

SEPTEMBER 27-28, 1984
Indiana Computer Expo to be held in Indianapolis, IN with over 130 exhibitors. For more information, contact Trade

Show Group 317-259-1757
SEPTEMBER 28-30, 1984

Rainbowfest will be held in Princeton, NJ at the Hyatt-Regency. For more information, contact James Reed 502-228-4492, Prospect, KY

SEPTEMBER 29-30, 1984
The 2nd Annual Boston Area Microcomputer Show will take place from 10am-5pm at the Northeast Trade Center, Rt. 128, Woburn, Mass. For additional information, contact Ken Gordon Productions 201-297-2526

OCTOBER 1984

OCTOBER 1-4, 1984
Info 84 takes place at the New York Coliseum. "Integrating Personal Business Computers into Corporate Information Systems" will be the theme. For more information about the conference, contact Leo Bowser, Cahners Exposition Group, 999 Summer St., Stamford Conn. 06905. 203-964-0000

OCTOBER 2-4, 1984
East Coast Computer Faire will be held at the Bayside Expo Center in Boston, Mass. 225 companies will be exhibiting in 500 booths. For more information, contact Computer Faire, Inc. 617-965-8350

OCTOBER 4, 5 & 6
The Micropolis Computer Mall Show, Altamonte Mall, Altamonte Springs, Florida. For more info call 717-646-1500.

OCTOBER 11, 12, 13 & 14
The Micropolis Computer Mall Show, Granite Run Mall, Media, PA. For more info call 717-646-1500.

OCTOBER 12-14, 1984
Midwest 99/4 Computer Expo to be held at Fond du Lac County Fairgrounds, Fond du Lac, WI. For more information, contact The Wisconsin 99er Computer Council, PO Box 1031, Fond du Lac, WI 54935.

OCTOBER 11-12, 1984
SOFTWARE FOR PROJECT MANAGEMENT AND ESTIMATING will be presented in Washington D.C. For more information, contact CIP Information Services, Inc., 1105-F Spring Street, Silver Spring, MD 20910; 301-589-7933.

OCTOBER 12-14, 1984
2nd Annual Heart of Texas Computer Show.
To be held in San Antonio, TX at the Convention Center. For more information write Heart of Texas Computer Show, P.O. Box 12094, San Antonio, TX 78212 or call (512)681-2248.

OCTOBER 13-14, 1984
Great Southern Business & Computer Shows & Seminars will be held at the Orlando, FL Centroplex Expo Center. For more information, call 904-356-1044

OCTOBER 16-18, 1984
The West Coast Electronic Office Expo & Conference (EOE '84)
To be held at the San Jose Convention Center, San Jose, CA. For more information write or call Cartledge & Associates, Inc., 4030 Moorpark Ave., Suite 205, San Jose, CA 95117 or call (408) 554-6644.

OCTOBER 20, 1984
Tampa Hamfest will be held from 8am-8pm at Fort Homer Hesterly Ar-

mory. Swap tables, door prizes and free parking.

OCTOBER 25-28, 1984
The Second PC Faire to be held in San Francisco Civic Auditorium and Brooks hall. Over 700 booths. For more information, contact Computer Faire, Inc. 617-965-8350

OCTOBER 25-28, 1984
Red Rose Computerfest to be held in Guernsey Sales Pavilion in Lancaster, PA. General admission \$3; spouse and children under 14 free. For more information, contact Computerfest Committee, PO Box 5029, Lancaster, PA 17601

OCTOBER 1984
Daton Computer SELL-A-RAMA will be held in Daton, Ohio. Buy & Sell computer hardware, software, peripherals, video equipment & games. Held jointly with Ohio Camera Swap. One admission both events. Reserve tables early. Call or write Bill Bond, 8910 Cherry, Blue Ash, Ohio 45242; 513-891-5266 or Ken Lewis 513-851-9872.

NOVEMBER 1984

NOVEMBER 1-4, 1984
7th Annual Northeast Personal & Business Computer Show will be held at Boston's Hynes Auditorium. The show includes over five hundred booths and displays featuring personal and business computers, peripherals, software accessories and publications. Admission is \$8. Show hours are 10am to 5pm daily. For more information, call or write Northeast Expositions, 822 Boylston St., Chestnut Hill, Mass. 02167; 617-739-2000.

NOVEMBER 2-4, 1984
Jacksonville Business & Office Showcase to be held at Veterans Memorial Coliseum in Jacksonville, FL. For more info, call 904-356-1044

NOVEMBER 4-7, 1984
8th Annual Symposium on computer Applications in Medical Care at Washington Hilton in Washington, D.C. For registration information, contact Gail Mutnik, Symposium Coordinator, SCAMC, Office of CME, George Washington University Medical Center, 2300 K Street N.W., Washington, D.C., 20037

NOVEMBER 7-8, 1984
"LOGOSYSTEMS '84" will be held at Stouffer's/Kellogg Center in Battle Creek, MI. This show will feature qualified speakers from the information processing field, modern displays of hardware, software, and accompanying peripherals and supplies. For more information call Marilyn Miller at 517-655-2756 or write to "Logosystems 84" IMPA, PO Box 16267, Lansing, Mich. 48901-6267.

NOVEMBER 16-17, 1984
8th Annual FORTH Convention will be held at the Hyatt Palo Alto in Palo Alto, Ca. It is a two day convention of hands-on tutorials, exhibits/vendor booths, lectures and discussions. For further information call FIG HOT LINE 415-962-8653 or write the FORTH Interest Group, PO Box 1105, San Carlos, Ca. 94070.

DECEMBER 1984

DECEMBER 4-8, 1984
International Conference on ROBOTICS AND FACTORIES OF THE FUTURE will be held at the University of North Carolina in Charlotte, N.C. For more information call Dr. Dwivedi 704-597-4190.

(113B) COMMODORE SOFTWARE, PERIPH.

VOSKMODEM 300 BAUD \$59.95. Adaptor cable for VIC 20/64 \$22.95. Free membership to Source Limited Time Offer. Voskmodem has lifetime warranty, Auto Selects, Ori/Ans. Direct Connect Bell 103. Visa & MC accepted. Add 2% shipping. **Acom Electronics**, 4151 Middlefield Rd. Dpt. 150, Palo Alto, CA 94303. 7-56

VIC 20 PROGRAMS

EDUCATIONAL - Morse Code Trainer, Mathfacts, Alphabet, Spelling Teacher, States & Capitals, Latin Vocabulary, Spanish Vocabulary. **GAMES** - Baseball, Descender, Mastermind, Simon, Compu-Craps. **HOUSEHOLD** - Menu Designer (8k & Printer). Tape - \$5.95 each - \$49.95 set. **KINNEY ASSOCIATES**, 131 N. Main Street, Sharon, MA 02067. 8-56

DISCOUNT Commodore SOFTWARE. Save 15-30%. Examples: Easy Script \$47.95, The Manager \$63.95, Word Pro 3+/64(spellwrite) \$79.95, Multiplan \$79.95. Hundreds of titles available. Write for free catalog. **SoftTOUCH Computers**, Box 92, Uncasville, CT 06382. 8-57

SPEED HANDICAPPER. A horse of a different color—see Ad under Misc. Software, heading 192. 8-57



**C-64 SOFTWARE
35 PROGRAMS
\$12.95**

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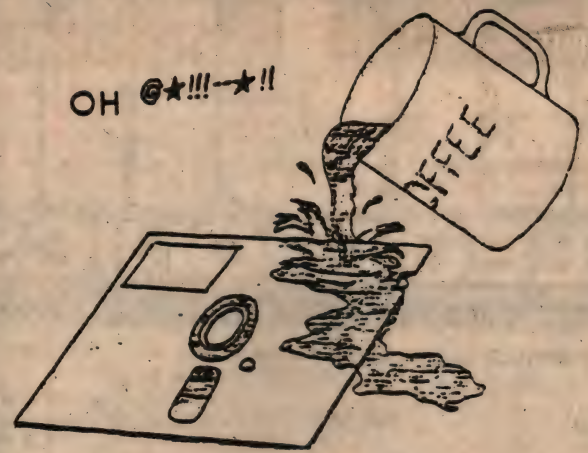
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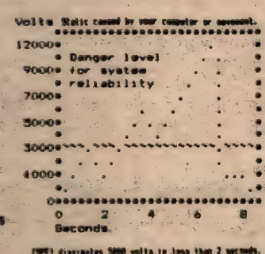
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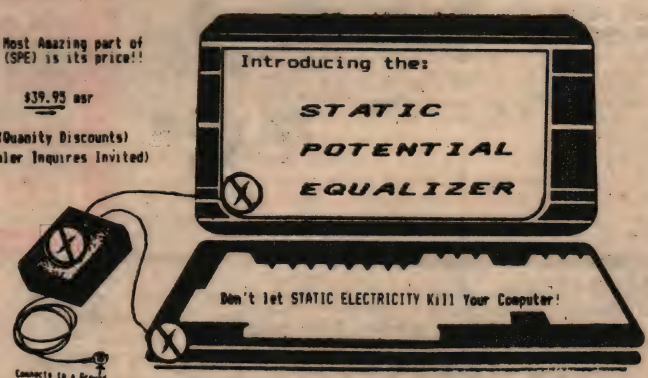
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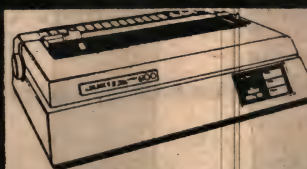
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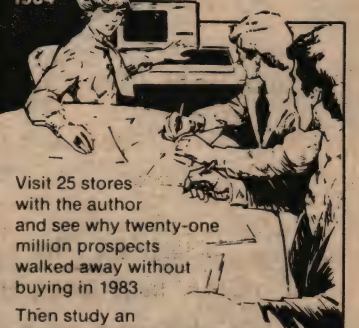
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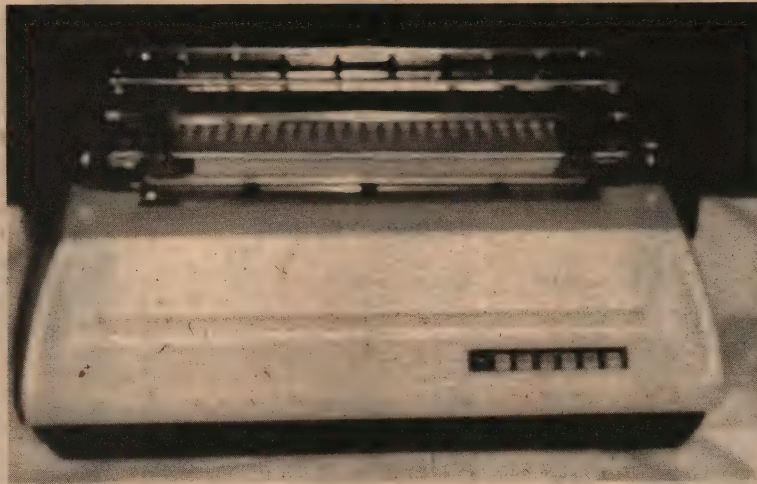
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74LS11	.34	74LS122	.44
74LS12	.34	74LS123	.78
74LS13	.44	74LS124	2.85
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74LS15	.34	74LS126	.48
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74LS26	.28	74LS137	.98
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74LS28	.34	74LS139	.54
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74LS32	.28	74LS147	2.45
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74LS37	.34	74LS151	.54
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74LS40	.24	74LS154	1.85
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74LS47	.74	74LS156	.68
74LS48	.74	74LS157	.64
74LS49	.74	74LS158	.58
74LS51	.24	74LS160	.68
74LS54	.28	74LS161	.64
74LS55	.28	74LS162	.68
74LS63	1.20	74LS163	.64
74LS73	.38	74LS164	.68
74LS74	.34	74LS165	.94
74LS75	.38	74LS166	1.90
74LS76	.38	74LS168	1.70
74LS78	.48	74LS169	1.70
74LS83	.59	74LS170	1.45
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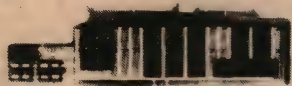
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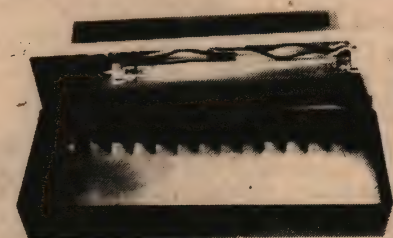
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EPROM Eraser

\$57.95

QUV-T8/1 Economy Model: This is a low cost EPROM Eraser housed in a plastic enclosure. The UV element and components are installed in the top lid and you place the EPROMS in the bottom half. No timer or switch option is included.

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- 80 Column card for Apple II+
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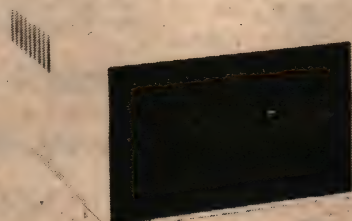
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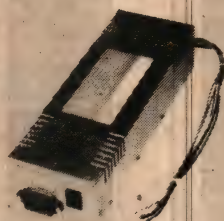
COOLING FAN

38.⁹⁵



APPLE COMPATIBLE POWER SUPPLY

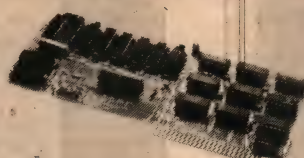
74.⁹⁵



- Powers Apple-type systems
- +5V @ 5A +12V @ 3A
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16K RAM Card Apple II+

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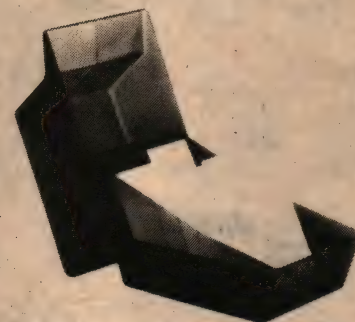
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The FLIP SORT™

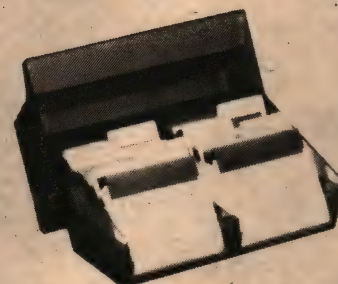
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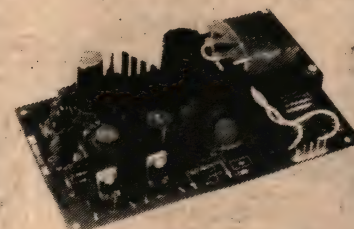
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34.⁹⁵



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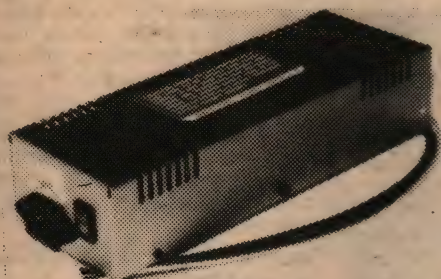
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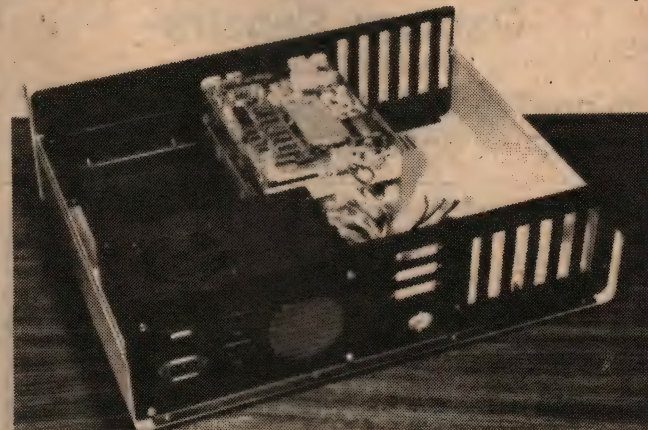
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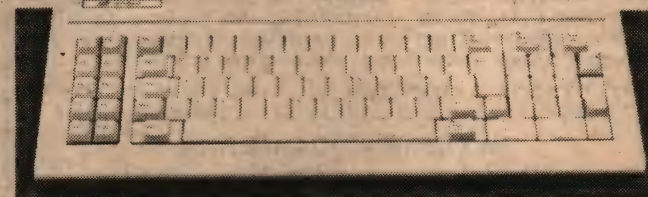
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GSCS is a division of Murdock Advertising Agency, Inc. A 55 year old show management and advertising agency. Saturation Advertising Campaign and Public Relations Program will be implemented for each GSCS. Each show will be expertly promoted, regionally and nationally will **Custom Target Marketing** through the following media:

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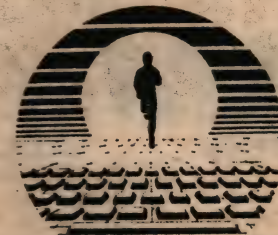
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**(128) MISC. MICRO.
SOFTWARE, PERIPH.**

ALPHA SYNTAURI Music Synthesizer. Metatrak, Superplus, Alphaplus, Protio; Draw Waves, Albums, Manuals. Includes 64K

System II Controlling Computer w/Apple Disk Drive. Complete system \$1800. 702-459-8341. **Bob Moore**, 4600 Montebello, Las Vegas, NV 89110.

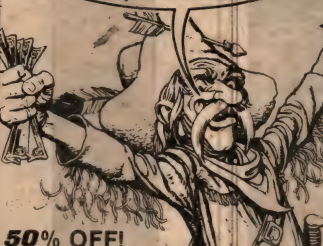
dBASE II AVAILABLE for the following computers for \$85. ADDS Viewpoint, ADM-31, Canon AS100, Lompaq, Cromemco, Eagle1600, Grid Compass, Hazeltine 1500, Perkin Elmer, Soroc, Televideo, Toshiba T300, Visual 100, Wang PC, Corona PC. **Joe**, 505-266-2344. 9-58

(129) S-100 COMPUTERS

MARINCHIP 9900 board set, CPU, disk control, prom/ram, I/O, DOS and NOS software and utilities. \$1250. **P. Stakem**, Box 745, College Park, MD 20740. 8-57

THE OLD SCOUT SAYS...**TRACK DOWN**

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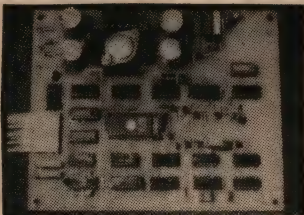
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**CP/M EPROM
PROGRAMMING SYSTEM**

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2764



2732A
27128
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27C32
27C64

- STAND ALONE BOARD - ELECTRONIC SWITCHING OF EPROM TYPES
- USES 24 VOLT XPMR FOR POWER - ALL SUPPLIES/TIMING ON BOARD
- DESIGNED WITH EASY TO GET PARTS - COMPREHENSIVE 28 PG MANUAL
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**** CONTROL PROGRAM COMMANDS ****

- PROGRAM EPROM(S) FROM DISK
- READ DISK FILE INTO RAM
- READ EPROM(S) INTO RAM
- VERIFY EPROM IS BRASED
- DISPLAY/MODIFY RAM - (MONITOR MODE) WITH 11 SUB COMMANDS
- FILL-DUMP-XFER-EXAMINE-MODIFY-BIAS-PROGRAM-VERIFY, ETC.)
- SAVE EPROM(S) TO DISK
- PROGRAM EPROM(S) FROM RAM
- COMPARE EPROM WITH RAM
- COPY EPROM

BARE P.C. BOARD WITH COMPLETE DOCUMENTATION AND SOFTWARE ON 8" SINGLE DENSITY DISKETTE \$69

(ABOVE WITH COMPLETE PARTS KIT - \$169) (A&T - \$189)
SOFTWARE AVAILABLE FOR OSBORNE, KAYPRO OR ON 2764 EPROM

TO ORDER SEND CHECK, MONEY ORDER, WRITE OR CALL

ANDRATECH
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(513) 752-7218

CALL OR WRITE FOR MORE INFORMATION --- ADD \$300 FOR SHIPPING
OHIO RES. ADD 5.5% TAX --- VISA/MC. ACCEPTED --- \$300 FOR COD

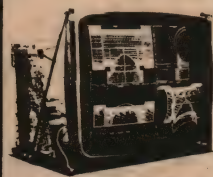
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OPPORTUNITY COMPUTER PARTS
MART**

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**ULTRA-HIGH-RES CRT
DISPLAY MONITORS**

Made by VMI for Calma, Lexidata, Genisco, Penta Systems, etc.

1280 dots x 1024 lines x 60Hz, 60KHz scan rate, 100MHz dot rate. Beautiful enclosure. New in cartons. Manual included **\$1195**



Bare frame CRT:
Same as above, except 1024 dots x 800 lines x 60Hz, 50KHz scan rate, 80MHz dot rate. New in factory cartons. Manual incl. **\$599**

**SPECIAL! WINCHESTER SYSTEM
HIGH-PERFORMANCE 4MHz Z-80 with CP/M 2.2**

900K 5 1/4" DS/DD FLOPPY designed by Micropolis
5 MBY ST-506 WINCHESTER DRIVE

Comparably equipped IBM PC costs \$4000+ OUR PRICE **\$1595.00**

Not only is the price unbeatable, but the quality of our system is extremely high. A professional, high-speed machine in a beautifully finished enclosure. Designed for rigorous use (not rigor mortis!) and easy repair.

STANDARD PERIPHERALS:

- Winchester by Seagate
- Quad density floppy system by Tandon
- Xebec Winchester controller
- Detach. Microswitch kbd.
- CPU by Zilog
- Power by P.G. GE.1

Your Winchester comes filled with PUBLIC DOMAIN software, incl. programs such as "sweep" and "D". CP/M includes source code for Bios & boot prom. System features printer port & serial port, and spare 5-100 slot for adding graphics, extra memory, 8086 board, etc. Additional software - see below.

**8086 HARDWARE
LOVERS' DREAM:**

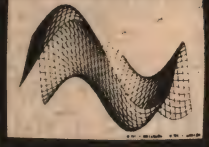
MAIN BOARD: 8086, 64K x 9, 8253, 8259A, modem port & printer port, SIO. Multibus expansion board for additional memory, processors, graphics, I/O etc.

DISPLAY BOARD: 96 char. x 40 line dual intensity txt. 862x511 graphics.

Great CP/M bios avail. Complete unit, working, schematics incl. Indiv. components avail. sep'l'y. Send SASE for list of components, systems, software

TALOS DIGITIZERS

1000 dots per inch



60" x 44", Now only **\$1500**

**Princeton Electronic Products
PEP-500 IMAGE SCAN
CONVERTOR SYSTEM**

Writing speed=450uSec/scan line
Storage half life: 'Power on' = 2hrs.; 'Power off' = approx. 2 months

Video resolution = 64 Gray levels; Spatial resolution 4096 x 4096; Full screen erase = 66mSec **\$495**
Full schematics and doc's avail - Call

SYSTEM BOARDS		GENISCO/CALMA	Function	3C6B SYSTEM
Genisco P/N	Calma P/N			Their Price Our Price
3032	95606	Monitor contrl.		\$2975 \$995
3031	95603	Video contrl.		\$2100 \$695
3026	95607	Memory		\$1680 \$395
3012	95602	Progr. graphics proc.		\$1000 \$695
10-slot card cage plus power supply				\$2000 \$695
(All you need for complete system with boards) All for \$3500				

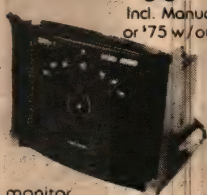
LEXIDATA/CALMA
"631R3" 92380Hi-res. bit mem. plane **\$1000 \$395**

"THE PERFECT MONITOR"

— PANASONIC H-15504NA — IBM PC compatible **\$85.00**

- 15" green anti-glare screen
- 1200 lines resolution
- 22 MHz bandwidth
- Internal Power supply
- 100-264VAC, 50/60Hz
- Hor. scan rate
- 15.7KHz/48.2KHz

(by changing one cap., this monitor functions at 18.2 KHz, which is required by IBM PC)
• Sync signals Pos. going TTL
Separate H, V video inputs. Includes 3-transistor composite video converter for use w/Apple, etc. Hookup diagram included. Only for the electronically adept - no hand-holding, please!

**ARTELONICS 1000 SYSTEM**

DISPLAY: 15" P39 w. extremely pleasing high-contrast filter.
DISK CONTROLLER: Multibus dual density (BLC82/22 or equivalent).
DISKS: Dual 8" in separate encl.
KEYBOARD: 94 key with 16 function keys. **\$1250**

SYSTEMS PLUS S-100 Computer, with 120 Meg Hard Disk, and 8" DSDD Shugart floppy. Hard disk partitioned into 8M and 2M. Main-frame with 14 slots, full documentation. Can be configured as A, B, C or A, E, F (users choice). Asking \$3000 with 90 day guarantee. Contact **Bob or Joan. TR Machinery**, 45 North Gaston Ave., Somerville, NJ 08876. 201-722-2040) Weekdays 9-5. 8-56

SOL II, two 8 inch disk drives, printer, all software, runs great, best offer. **Jeffries**, P.O. Box 295, Winthrop, WA 98862. 7-56

DYNABYTE 5300 Computer. Dual 8" SSDD Disk Drives, 64K RAM, CP/M, CBASIC, MBASIC, Business Manager Accounting System. \$2495. **SOROC IQ-130** Video Terminal \$350. **NEC PC-8023A** Printer. \$300. Low hours, in excellent condition, with all documentation. Complete system only \$2995. Call **Cliff** at 509-525-2580. 8-57

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You just can't go wrong with CompuPro - you can fully satisfy present needs, yet easily expand memory, storage, users, or add new technology any time. S-100 systems provide real protection against the obsolescence factor. Systems run 8 & 16 bit software simultaneously, have a one year warranty, and include a package of business oriented software. Used equipment?? - You betcha! Lease-Purchase?? - Certainly!

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8-57
S100 IMSAI DIO-C RAM-32 3P+S VIO-C MPU-B RAM-16 with manuals. After 7pm EDST: **Bill**, 609-587-9248. 9-57

BILD-UR-OWN S-100 system with our great, inexpensive kits; power chassis with mother board \$195: cpu, 8085, less ic's \$65: ram board (less ic's) \$95. Limited offer. Each kit is 100% complete, less ic's, and includes instructions. **302-999-0514. CROMEMCO Z2D SYSTEM OR COMPONENTS:**
ZPU, 2.4 Mhz Z80 S100 CPU, can fully emulate IMSI 8080 bus signals, \$95 with manual.

4FDC, floppy disk controller, can handle up to five 5" or fifteen 8" drives, can mix 5" and 8", has 1 RS232 serial and 1 parallel port, DMA capability, 1K boot ROM, \$95 with manual.

64KZ, 64K byte dynamic RAM, on board refresh, board banking using I/O address 40H in 32K banks, \$200 with manual.

Z2D CHASSIS; 21 slot mother board with ground plane buss isolation; 30A +8VDC, 15A +15VDC, and 15A -15VDC power supplies; two 5" floppies mounted on a hinged front door; designed for rack mounting; with drives \$500, without drives \$300, drives \$100 each, all with manuals. Call **Pete** 5-9PM CDST 713-908-3733. 9-58

CROMEMCO Z-2D w/Cromix CDOS CP/M 2.5 1/4" DSDD \$1800 after 5PM EST. 813-831-5550.

MS-DOS/CPM-86 S-100 system, 12 slots, 8088/8087/8089 CPUs, 128K CMOS RAM, 64K low power RAM (all static), battery-backed up clock, 2 serial, 2 parallel ports, Jade bus probe, kluge card, 2-8" DSDD drives, 1-5 1/4 in. SSDD drive, ADM-2A CRT, Pascal, C, BASIC, FORTH, \$2450. Very flexible, must sell. **Dan Pritchard**, 4721 Bali Ct., Albuquerque, NM 87111.

OCTAGON CPU 8/16 with concurrent CPM V3.1 \$750. Octagon 20 meg hard disk with controller, \$1500. Call **Tony** after 6pm: 312-349-9032. **A.J. Rudis**, 13550 Chippewa, Lockport, IL 60441.8-56

CONVERSE WITH YOUR COMPUTER!

AT LAST! A FULL IMPLEMENTATION of the original ELIZA program is now available to run on your microcomputer!

Created at MIT in 1966, ELIZA has become the world's most celebrated artificial intelligence demonstration program. ELIZA is a non-directive psychotherapist who analyzes each statement as you type it in and then responds with her own comment or question - and her remarks are often amazingly appropriate!

Designed to run on a large mainframe, ELIZA has never before been available to personal computer users except in greatly stripped down versions lacking the sophistication which made the original program so fascinating.

Now, our new microcomputer version possessing the **FULL** power and range of expression of the original is being offered at the introductory price of only \$25. And if you want to find out how she does it (or teach her to do more), we will include the complete **SOURCE PROGRAM** for only \$20 additional.

Order your copy of ELIZA today and you'll never again wonder how to respond when you hear someone say, "Okay, let's see what this computer of yours can actually do!"

ELIZA IS AVAILABLE IN THE FOLLOWING FORMATS:

1. 5 1/4 inch disk for the Apple II, II Plus, IIe or III.
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4. Standard 8 inch single density disk for all CP/M based computers.
\$25 for ELIZA.COM - \$45 for ELIZA.COM plus Microsoft BASIC-80 Source
5. 5 1/4 inch disk for most CP/M based computers (specify make and model).
\$25 for ELIZA.COM - \$45 for ELIZA.COM plus Microsoft BASIC-80 Source

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(129) S-100 COMPUTERS**S-100 BARGAIN!**

Z-80 CPU, S-100 IEEE-696, S.S.M. "CB-2" Bare Board. Features extended address (24 bits), up to 8K

prom/ram (2 sockets). Jump on reset, 2/4MHz. Bare Board only \$19.95. Manual and schematic \$7.95. Both for \$24.95. Computer Parts Mart, 3200 Park Blvd., Palo Alto, CA 94306. 415-493-5930.

SYSTEMS PLUS S-100 system, 10 meg hard, DSDD 8" floppy, 14 slot mainframe. Includes CPM 2.2 and all documentation. 90 day warranty. Asking \$2500. 201-722-2040. 9-57
SOL-20 COMPUTER 64K C27 North-

star S.S.D. Disk Drives Northstar DOS 5.2, Basic, misc. software. Mint condition. \$950. Elmer, 513-434-5529. 9-57

\$100 COMPUTER Compuprism high-density graphic board, \$25. Imsai

CPU board \$25. Jade DD disc-controller board with manuals, \$150 or best offer. 2708 - \$.50 @. 2716 - \$.2 @. 2732A - \$.2 @. Richie, 813-997-3047.

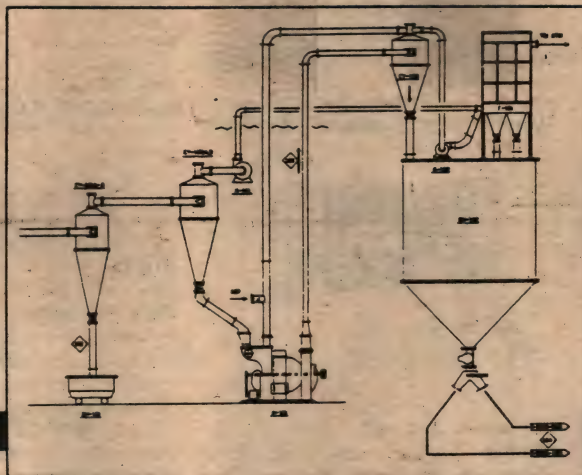
\$100 COMPUTER. This is a very fine dual floppy CPM system. This system was used for only two months and is in perfect condition. The drives, 5 slot S100 back plane and power supplies are contained in an INTEGRAND 1100 box which is painted black with wood veneer side pieces. The Teletek System Master single board computer occupies one of these slots. This single card contains 64 kilo bytes of memory, 2 serial ports, 2 parallel ports, DMA floppy controller, and a 4 Mhz Z80 processor. The two Qume Data Track 8 double sided 8 inch floppy disk drives can store 1.2 mega bytes each. These drives were chosen because of their speed (3ms track to track) and reliability. CPM/Wordstar etc is provided. Asking \$1800. Service is available on this system. Documentation is provided. Call Larry at 603-889-2165. 9-57

YOUR S-100 PLUS OUR M-1000 = CAD

M-1000 CAD subsystem for S-100 includes 512 x 480 color graphics display, digitizer, plotter, all interface boards and cables and RGB monitor.



MOMS COMPUTING



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ZF-101-31 COMPUTER. Single 320K half height disk drive, 192K RAM. Monitor sold separately. Color RAM set required for color separately. Retail \$3029, Payload Price \$2479
ZF-111-22 COMPUTER. Two 320K half height disk drives, Color Graphics, 128K RAM. Monitor sold separately. Retail \$3499, Payload Price \$2807
ZW-111-32 COMPUTER. Internal 11 MEG Winchester hard disk drive, one 320K half height disk drive, Color Graphics, 192K RAM. Monitor sold separately. Retail \$5499, Payload Price \$4172

** ZENITH ALL-IN-ONE COMPUTERS **

ZFG-121-32 COMPUTER. Two 320K half height disk drives, 192K RAM. Green Screen monitor built in. Retail \$3729, Payload Price \$2905
ZFA-120-22 COMPUTER. Two 320K half height disk drives, 128K RAM, Amber screen monitor built in. Retail \$3729, Payload Price \$2887
ZWG-121-32 COMPUTER. Internal 11 MEG Winchester hard disk drive, one 320K half height disk drive, 192K RAM, green screen monitor. Retail \$5599, Payload Price \$4228

** ZENITH IBM COMPATIBLE COMPUTERS **

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ZF-151-22 COMPUTER. Same as above but with two disk drives. Retail \$3099, Payload Price \$2470

** MONITORS FOR Z-100, Z150 SERIES **

** AND OTHER COMPUTERS **

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ZVM-122 High Resolution Amber Monitor 12" diagonal \$165
ZVM-123 High Resolution Green Monitor 12" diagonal \$135
Z-29 SMART DATA TERMINAL Detached keyboard, 12" green \$694

** Z-100 ZDOS SOFTWARE **

	OUR LIST PRICE
Lotus 123	\$495 \$445
dBASE II	\$695 \$460
CONDOR Rel. Data Base Management	\$650 \$429
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The Z-150 series computers will run all IBM MSDOS software. We have available most of the popular programs at PAYLOAD PRICES. Please call or write for specific items.

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MICROSOFT GW BASIC Interpreter	\$175 \$158
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MULTIWORD VERSION 1.1	\$375 \$308
Z-150 DIAGNOSTIC SOFTWARE	\$79 \$72
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SOFTWARE CLOSE OUT FOR ZENITH HIZ-89

We purchased the complete inventory and can offer the following Zenith Software Packages below dealer cost. All are 5.25" sealed disks with registration cards and manuals. No more available after these are gone.

HSC-817-1 SuperCalc for CP/M, Hard Sector \$60
HSC-837-1 SuperCalc for CP/M, Soft Sector \$60
HMS-817-1 Microsoft BASIC Interpreter for CP/M, Hard Sector \$60
HMS-837-1 Microsoft BASIC Interpreter for CP/M, Soft Sector \$60
HOS-8937-2 CP/M-80 Operating System, Version 2.2, Soft Sector \$60

** UPGRADE ACCESSORIES FOR **

** Z-100 and Z-150 SERIES COMPUTERS **

COLOR GRAPHICS UPGRADE. All memory chips required to update Z-100 Series computer for color. Installation instructions included. Complete \$112

MEMORY UPGRADE. All memory chips required to upgrade Z-100 computers from 128 to 192 KB RAM. Upgrades Z-150 computers 64K additional for each kit ordered up to 320K maximum. Installation instructions included \$63

SECOND INTERNAL DISK DRIVE. We can supply a matching drive to update your single drive Zenith computer to a two drive unit. Please let us know what you have and we will quote the Payload Price.

** UPGRADE ACCESSORIES **

** FOR HIZ-89 COMPUTERS **

Magnolia Microsystems Double Density Controller. Soft-sectored disk controller. Supports up to four each 5.25" and 8" disk drives. Complete with cables, installation instructions and CP/M 2.242, Payload price \$354
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** MEMOREX DISKS **

These are the disks we use at PAYLOAD. They are top of the line, and reasonably priced. Prices are NET postpaid. No shipping and handling charge for disk only orders.

#3481 5 1/4" SS/DD Soft Sector, Box of ten \$24.70
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#3491 5 1/4" DS/DD Soft Sector, Box of ten \$32.10

#3493 5 1/4" DS/DD 10 Hard Sector, Box of ten \$32.10

#3501 5 1/4" DS/DD Soft Sector 96 TPI, Box of ten \$41.10

#3062 8" SS/DD Soft Sector, Box of ten \$27.90

#3102 8" DS/DD Soft Sector, Box of ten \$38.40

** EIGHT INCH DISK DRIVE SYSTEM **

Two Tandon 8" TM848-2 Thinline, Double Density, double sided drives in Deluxe Cabinet with Heavy Duty Power Supply and Cooling Fan, 2.4 MEG Storage Total. With Cable Ready for any HIZ-100 or HIZ-89 with Magnolia DD Controller. \$1135

INTERNAL DUAL DRIVE SETUPS FOR THE HIZ-89 COMPUTER

Each setup includes two half height double sided disk drives and all hardware and connectors required to mount inside your H-89. The Qume Setup includes mounting hardware to connect the two drives into one unit which mounts the same as a standard single drive. The Qume drives run soft sector only. The Mitsubishi and Panasonic drives will run as soft sector or hard sector and come with a new mounting shield/case. This shield/case is required for the 96 TPI drives but may be deleted (deduct \$30) from orders for the 48 TPI setups. If this case is deleted you must drill four mounting holes in your existing drive mounting shield.

Qume Trak 142 Setup, 48 TPI, 6 MS seek, 640K total \$435

PANASONIC/NATIONAL JA-551-2 Setup, 48 TPI, 6MS seek, 640K total \$414

MITSUBISHI 4851 Setup, 48 TPI, 6 MS seek, 640K total \$492

MITSUBISHI 4853 Setup, 96 TPI, 3 MS seek, 1280K total \$548

** DISK DRIVES **

We recommend the 5.25" Tandons for replacements only. For new setups, you should purchase the newer generation, more reliable and less expensive half height drives. As for Eight inch, we think the Tandons are the best and recommend them highly. The Qume Trak 142 drives have the advantage of easily mounting together and then mount as a standard size drive. Order two and request this hardware at no charge. The Panasonic/National drives are made in Japan by Matsushita. This is the same company that makes the Shugart SA445 and we can not tell the difference except by price. The Mitsubishi drives are now standard in all the new Zenith computers. We think they are the best drive on the market today.

TANDON TM848-2 8" Thinline, DS, DD, 48 TPI \$445

TANDON TM100-1 5.25" Single Side, Double Density, 48 TPI \$194

TANDON TM100-2 5.25" Double Side, Double Density, 48 TPI \$245

TANDON TM101-4 5.25" Double Side, Double Density, 96 TPI \$295

CONTROL DATA 9409 5.25" Double Side, Double Density, 48 TPI \$260

CONTROL DATA 9409T 5.25" Double Side, Double Density, 96 TPI \$315

MITSUBISHI M4851 5.25" Half Height, DS, DD, 48 TPI \$225

MITSUBISHI M4853 5.25" Half Height, DS, DD, 96 TPI \$225



QUME trak 142 5.25" Half Height, DS, DD, 48 TPI \$225

PANASONIC/NATIONAL JA551-2 5.25" Half Height, DS, DD, 48 TPI \$185

** POWER SUPPLY AND HOUSINGS **

For standard and half height disk drives. Rugged steel construction with heavy duty power supplies. Purchase with drives and we will configure and install in housing for you.

Single 5.25" unit \$68

Dual 5.25" unit, specify standard or half height \$92

Dual 8" unit with fan, for thinline drives \$225

Face Plate for single drive in dual case \$8

** C.I.TOH DOT MATRIX PRINTERS **

GORILLA BANANA. Reliable companion for most computers. Serial or parallel interface. Retail \$249.95, Payload Price \$179.50

PROWRITER 8510-AP. 10" inch carriage, 120 CPS, Correspondence quality matrix. Tractor and Friction feed, Parallel interface \$366

PROWRITER 8510-BCD. Same as above but Serial interface \$467

PROWRITER/2 MODEL 1550P. Same as 8510-AP but 15" carriage \$569

PROWRITER/2 MODEL 1550PS. Same as above but Serial interface \$652

C.Itoh 8510-SP 10" carriage, 180 CPS, Tractor and Friction, parallel \$492

C.Itoh 8510-SR 10" carriage, 180 CPS, Tractor and Friction Serial \$541

C.Itoh 8510-SP 15" carriage, 180 CPS, Tractor and Friction, parallel \$769

C.Itoh 1550-SR 15" carriage, 180 CPS, Tractor and friction serial \$799

** C.I.TOH **

** LETTER QUALITY PRINTERS **

STARWRITER F-10. Daisy Wheel, 40 CPS. Fifteen inch carriage. Order Parallel or Serial interface. Retail price \$1795, Payload Price only \$1055

PRINTMASTER F-10. Same as STARWRITER except faster print speed, 55 CPS. Order parallel or serial interface. Retail price \$1995, Payload \$1263

OPTIONAL BI-DIRECTIONAL TRACTOR FEED for F-10 printers. Retail \$325, Payload Price \$214

Your satisfaction is guaranteed. All hardware carries a 90 day warranty. Prices are discounted for payment with order. VISA and MASTERCARD orders please add 3%. Please add \$5 to all orders for handling and shipping, we pay the balance. Call us, we will be happy to answer your questions. THANK YOU.

CHARLES C. PORTER, Proprietor
15006 SUN HARBOR, HOUSTON, TX 77062
PHONE (713) 486-0687

PAYLOAD COMPUTER SERVICES

(129) S-100 COMPUTERS

THIS TRADE-IN is a super deal for you at just \$1290. Two disk drives (300k ea), 9" built-in monitor, 48K RAM, 10 slot S-100 mother board, 8085 CPU, two S/I/O ports. Lots of valuable software included. 302-999-0514.

VECTOR 3005, 5MbHD, 128K, 12" screen, keyboard, serial, parallel ports. Software: Memotite WP, Execuplan Spreadsheet, Peachtree AR, AP, GL, PR. Full documentation, 18 mos. old. \$1250. You pay shipping. Chris, 1-214-893-6834.9-57

VECTOR GRAPHIC Parts: Tandon & Micropolis Drives, Various complete systems, 12k Prom/Ram Boards, Z-80 Boards, Flashwriter Boards, ZCB Boards, Bitstreamer Boards, Disk Controller Boards, 64k Ram Boards. Too many parts to list. Write or call for complete parts listing. Parts pricing negotiable. Lynn Cowden, 4347 Merle Hay Road, Des Moines, Iowa 50310. 515-276-8858. 9-57

THIS LIKE-NEW trade-in is a super deal for you at just \$990. Two 300k drives, two S/I/O ports, 8085 processor, and 56k RAM. Lots of valuable software included. 302-999-0514.

S100 SYSTEM XOR chassis (twelve slot), CCS2810 CPU, CCS2422 controller, DR64K static RAM, SSM-IO4, and CP/M 2.2. \$1100 OBO. Henry, 213-316-7334.

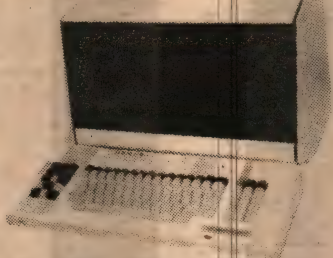
VECTOR GRAPHIC
with 5 meg hard disk
3005.....\$1399
3105.....\$1599
202-337-1303.



SMALL BUSINESS or Professional computer system. Cromemco system zero desk cabinet with DDF dual 5 1/4 disks, Cromemco DPU Z80 - 68000 processor, 64FDC controller, 256KB RAM, TU-ART I/O card. Morrow MP-200 (Silver Reed) Daisy Wheel printer. CP/M, CDOS

and CROMIX operating systems. M/basic - 68K basic - Wordstar and other software. Will run Data-base, payroll or other business software. Six months new. Prices = \$6000 with Qume QVT-102 Terminal, \$5550 without, FIRM. You pay shipping. Phone Bill at 305-676-1882 evenings.

Winchester System - \$1595



4 MHz Z-80 with CP/M 2.2
**900K Floppy designed by Micropolis ** 5Mby ST-506 Winchester drive. In original crates. A comparably equipped IBM PC costs \$4000+ : Not only is our price less than half, but the quality and speed of these systems is extremely impressive. Professional machines featuring 65K, DMA, CP/M 2.2 with

source code for bios and boot prom, detachable keyboard, amber CRT (less eye-strain for you!), and a Winchester filled with public domain software programs including "sweep" and "D". Printer port and serial port, spare S-100 slot for adding graphics, extra memory, etc. **SOFTWARE: WORDSTAR \$199; MICROSOFT COMPILER** package: Fortran 80, Cobol 80, Basic interpreter and Basic Compiler. All four for only \$295. Or, individually, on 5 1/4": \$100. On 8" \$120. Manuals: \$25/each. **Computer Parts Mart**, 3200 Park Blvd., Palo Alto, CA 94306. 415-493-5930.

DUE TO Purchase of new computer system, have following equipment for sale. Just taken out of service, excellent running condition. 3 units 10 meg. Altair/Mits hard disk w/controllers #D3422. 4 ea Altair/Mits 8800b 64k computers, 2 units 8" double floppy drives Altair/Mits in cabinets, 5 units 8" single disk drives in cabinets. 2 ea Beehive 150 terminals, alignment disk, proms and alignment programs for hard disks, extra turn key memory interface, printer boards serial and parallel, 24 removable hard disk

packs. Altair Basic on CP/M. Call Jeff at 800-327-6282. In FL 800-432-0328.

EXPLORER-85 48K+, 8K BASIC, keyboard, levels A-E \$500; CDC 8" floppy Mint \$250; Floppy driver board (S-100) \$250; All for \$750. Marcus Albrow, P.O. Box 1534, Poulsville, WA 98370. 9-58

MORROW DJ2, used, with 8" drive. As is. \$200. S-100 extension kit, with optional termination. \$50. Bare boards : SDS 8024 video \$25 : 64k ram \$30 : 8085 cpu \$10 : 10 slot s-100 mother board \$10. TEI 3P + 3S i/o board, as is. Fine shape, but modified slightly. Includes doc. \$200. 302-999-0514.

(130) S-100 COMPATIBLE, PERIPHERAL

HONEYWELL CORE memory 2-32K units, spare parts, \$200 for all. Processor Technology VDM-1, Processor Technology GPM, and Jade Big Z CPU \$50 each. Call Wade, 919-674-9222.

S-100 MAINFRAME, Ithaca Inter-systems DPS-1 Frontpanel 20 slot mainframe (\$400). GTC Infoton smart terminal RS-232 (mint) \$275. Various Ithaca Series II boards also (Call). Henry, 901-925-8335 after 9:00pm CST.

XITAN 8 slot mainframe \$125, 16K RAM boards, (3) SSM \$100, (3) Vandenberg \$100, (4) Cromemco 16KZ \$125, ITHICA Audio z-80 CPU \$80, CROMEMCO TU-ART \$150, PRI \$75, WDI \$250, ZPU \$100, or will set up and sell as complete working CROMEMCO system complete with CROMIX, CDOS, & CP/M after 5PM EST. 813-831-5550.

S100 CLOCK, IDS SPM-88, \$65; CompuPro CPU 8085/88 S100 dual processor, \$275; Godbout S100 Active Terminator \$20; Mullen TB-2 S100 Extenuator board, \$40; CompuPro S100/696 12 slot Motherboard, \$70. Northstar-Z80 S100 CPU (ZPBA) 2 each \$200. J. Lightsey, 303-443-7888 (evenings). 8-56

(131) S-50 COMPATIBLE PERIPHERAL**(132) HEATH COMPUTERS FOR SALE**

SA 860 8" DSDD Mint Shugart Drives half-height. These drives do not require AC to operate, TK to TK access time 3 MS, 1.6 Megabyte capacity. Come with 60 day warranty. \$279. C.E.C. 415-342-4058. P.O. Box 1965, Burlingame, Calif. 94010.

SA 860 8" DSDD Mint Shugart Drives half-height. These drives do not require AC to operate, TK to TK access time 3 MS, 1.6 Megabyte capacity. Come with 60 day warranty. \$279. C.E.C. 415-342-4058. P.O. Box 1965, Burlingame, Calif. 94010.

(132A) HEATH, SOFTWARE, PERIPHERAL

USED SOFTWARE for H/Z-100. dBASE II \$85, CP/M-86 \$85, CP/M-85 \$85, Wordstar with Mailmerge All Version 3.3 \$85, Turbo Pascal \$35, Lotus 1-2-3 \$85, Condor DBMS \$85, Peachtext 5000 \$85, Z-BASIC Compiler \$85, Cobol \$85, Multiplan \$75, Z-chart \$45, Z-BASIC \$75. Additional programs available, send or call for list. Joe, at 505-266-2344.9-58

Z-100 HARD Disk controller and data separator boards (Z-217-1). Includes cables, brackets, software, instruction manuals; no drive is included. Retail at \$895, selling price \$555. Just add a drive and you will have a hard disk Z-100. Doug Thompson, 604 W. John Beers Rd. Box 253, Stevensville, MI 49127. 616-429-1387.

DEC COMPATIBLE DISK SYSTEMS

Complete DEC RX02 compatible floppy disk systems with Micro Technology MXV22, 22 bit Q-Bus controller:

(1) 8" SS/DD drive (Siemens FDD100-8)	\$1500
(1) 8" DS/DD drive (Siemens FDD200-8)	\$1600
(2) 8" SS/DD slim line drives (Tandon 848-1)	\$2200
(2) 8" DS/DD slim line drives (Tandon 848-2)	\$2400

Floppy disk systems carry a 90 day warranty.

DEC RL01/RL02 or RK06/RK07 compatible system using 5 1/4" Winchester disk with MTI or Dialog Q-bus controller:

10 mega-byte = 2 RL01 or 1 RL02	\$2700
15 mega-byte = 3 RL01	\$2900
20 mega-byte = 4 RL01 or 2 RL02	\$3100
40 mega-byte = 4 RL02	\$3900
14 mega-byte = 1 RK06	\$3300
42 mega-byte = 3 RK06	\$4500
56 mega-byte = 4 RK06 or 2 RK07	\$5500
84 mega-byte = 6 RK06 or 3 RK07	\$6500
112 mega-byte = 8 RK06 or 4 RK07	\$7500

Winchester systems carry a 6 mo. warranty. Rackmount enclosure by Sigma for two Winchester drives or Winchester drive and floppy drive, add \$250 to above system prices. Call for details on other 5 1/4" floppy or Winchester disk systems.

Micro Technology, Inc. controllers used in the above systems ribbon cables included upon request:

MTI MXV22 Floppy disk controller (RX02 compatible, 22 bit addressing)	\$750
MTI MLV11M Winchester controller (RL01 or RL02 compatible 5 1/4" Winchester)	\$1250

Controllers carry a 1 yr. warranty from MTI

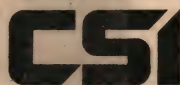
The 11 Connexion offers its desktop enclosures for 8" and 5 1/4" disk systems. These enclosures are made of .090 anodized aluminum painted with a tough commercial epoxy paint. The base is light gray with black trim and lettering and the top is egg shell white. Cabinets for 8" systems are 9"H x 11"W x 15"D and will hold a single full size 8" floppy or Winchester drive or two slim line floppy drives with room for many of the single board computers available today. The 5 1/4" cabinet is 6 1/2"H x 7"W x 11"D and will hold a single full size 5 1/4" floppy or Winchester or two half wide drives.

Either cabinet w/feet, power switch, fasteners	\$60
Cabinet, as above w/fan, EMI filter, power cord	\$95
Cabinet (8") as above, w/Condor P.S. for single drive	\$250
Cabinet (8") as above, w/Condor P.S. for dual drive	\$275
Cabinet (5 1/4") as above w/P.S. for Winchester drive	\$275

THE 11 CONNEXION

1815 Peterson Lane, Santa Rosa, CA 95401. (707) 545-7778

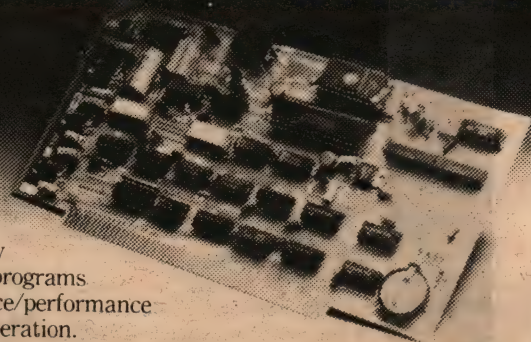
DB25 HOODS
\$1.00 (MINIMUM)
5 PCS.)

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Telephone (415) 861-1345

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Shipping/handling extra.
California residents add 6% sales tax.
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All goods subject to prior sale.

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AND NOW WE GIVE YOU TIME TO BURN...**



TimeEPROMmer, the S-100 CP/M* compatible programmer that's useful every second of every day. A real time calendar/clock with lithium battery and an EPROM programmer that programs all popular eproms. Unbeatable price/performance ratio. Features designed for easy operation.

Eprom Programmer: Port addressable. Read, Verify, Program, and Disk transfer. Handles up to 28 pins. Power generated and controlled on board. All software and documentation included. Assembled units tested with burn in.

Real Time Calendar/Clock: Complete time counting functions with CMOS LSI. Allows up to 6 months power down use. Independently port addressable.

TimeEPROMmer Kit & software & manual \$195
TimeEPROMmer A & T software & manual ... \$295
Our DISK CONTROL UNIT that turns 8" drives off when not being accessed. State drive.
DCU, kit & manual \$29.95
DCU, A & T & manual \$49.95
P & H \$2. NYS add tax.
CP/M is T.M. of Digital Research

OPTRONICS TECHNOLOGY

P.O. Box 81, Pittsford, N.Y. 14534, (716) 377-0369

3 FALL COMPUTER SHOWS (& FLEAMARKETS)

(Our 6th. year!)

NEW JERSEY

Saturday September 15
10 AM to 5 PM

&

Sunday September 16
10 AM to 4 PM

(fleamarket opens 9:00 AM on both days)

MEADOWLANDS HILTON HOTEL

Route 3 & Meadowlands Parkway—Secaucus, NJ

(One Mile East of NJ Sports Complex)

OVER 250 VENDORS OF NEW & USED COMPUTER PRODUCTS

ADULTS: \$6.00, CHILD (5-12) \$3.00

VENDOR & FLEAMARKET INFORMATION

Exhibit booths are \$250.00 each and include table, chairs, sign & electricity. Call (201) 297-2526 for space reservations which may be charged to American Express, Master Card or Visa. Fleamarket spots (no table or electricity), in the "all-weather" drive-in fleamarket area (7'6" max. height) are \$25.00 each and are sold on the day of show only, beginning at 7:30 AM.

PHILADELPHIA

Saturday September 22
10 AM to 5 PM

&

Sunday September 23
10 AM to 4 PM

HALLORAN PLAZA HOTEL

(formerly the Ivystone Inn)

Route 130 (South) — Pennsauken, NJ

(2 Minutes from Philadelphia/Camden/Cherry Hill)

OVER 175 VENDORS OF NEW & USED COMPUTER PRODUCTS!

ADULTS: \$5.00, CHILD (5-12) \$3.00

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Exhibit booths are \$200.00 each and include table, chairs, sign & electricity. Call (201) 297-2526 for space reservations which may be charged to American Express, Master Card or Visa. Fleamarket tables (indoors!) are \$40.00 each include one chair, one admission and one six foot table — no electricity is available! Tables are sold by ADVANCE RESERVATIONS & PAYMENT ONLY!

BOSTON

Saturday September 29
10 AM to 5 PM

&

Sunday September 30
10 AM to 4 PM

NORTHEAST TRADE CENTER

Exit #39 — Route 128 (I-95) — Woburn, Mass.

(10 Minutes North of Boston—2,000 free parking spots!)

OVER 200 VENDORS OF NEW & USED COMPUTER PRODUCTS!

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Exhibit booths are \$275.00 each and include table, chairs, sign & electricity. Call (201) 297-2526 or (617) 437-0090 for space reservations which may be charged to American Express, Master Card or Visa. Fleamarket tables are \$60.00 each and include one chair, one admission and one six foot table — no electricity is available! Tables are sold by ADVANCE RESERVATIONS & PAYMENT ONLY!

Ken Gordon Productions PO Box 13 Franklin Park, NJ 08823

(201) 297-2526 Main Office — (617) 437-0090 Boston Office

(132A) HEATH, SOFTWARE, PERIPHERAL

RAMDRIVE/85 for CP/M-85 on H/Z-100 series computers use extra ram as a fast ramdrive. Requires at least 192K of ram. Once integrated with bios installs automatically. \$39.95 + \$1 shipping. ZCOPY.COM copies ZDOS files to CP/M, \$24.95

+ \$1 shipping. J.J. Thompson, 281 Warren Ave., Kenmore, NY 14217. 7-56

PRINT Z100 Graphics on your Gemini or MPI printer. Program activated by pressing F12 shifted. \$20 with your printer type to Salvador Jimenez, 712 Amity Lane, Montgomery, Alabama 36117. 8-56

SA 860 8" DSDD Mint Shugart Drives half-height. These drives do not require AC to operate, TK to TK access time 3 MS, 1.6 Megabyte capacity. Come with 60 day warranty. \$279. C.E.C. 415-342-4058. P.O. Box 1965, Burlingame, Calif. 94010.

SA 860 8" DSDD Mint Shugart Drives half-height. These drives do not require AC to operate, TK to TK access time 3 MS, 1.6 Megabyte capacity. Come with 60 day warranty. \$279. C.E.C. 415-342-4058. P.O. Box 1965, Burlingame, Calif. 94010.

(133) BURROUGHS SYSTEMS

B800 w/console printer, 18.8 fixed, 9.2 cartridge, 1MB mini, 2 TD830, 300LPM printer, \$16,000 or make offer. Jim Belt, 916-926-3811. 407 So. Mt. Shasta, Mt. Shasta, CA 96067. 8-56

CONVERGENT TECHNOLOGIES AWS 200 work station. Option 265 with 386 KB RAM. 16 MB Winchester hard disk and 5 1/4 inch floppy drive. Mint condition. 6 months old. \$7500 firm. Telephone Modem: Universal Data Systems 201C. 0-1200 baud/2400 BPS. 2 wire or 4 wire (half or full duplex), auto answer operation. \$700 firm. Cash or certified check. Please call or write Mort McKenzie, P.O. Box 2811, Spring, Texas 77383. 713-353-3472. 7-56

(134) HEWLETT PACKARD COMPUTERS FOR SALE

HOW ABOUT this plotter right....here! Hewlett Packard

Model 9871A-810 8 pin plotter, driven a short distance by a little ole HP-9835. It's got all the colors! How about this price....\$3500. Pick up the phone. Give us a call. 205-325-2134.

HP-3000 CHEAPER than HP. We will sell or lease complete system, install & put under maint. agreement, saves you many \$1000's. Godfather's Used Computer Syndicate, P.O. Box 3037, 1154 W. SR 434, Forest City, FL 32714. 305-774-1000.

HP75C, \$650 (list \$995), cassette drive, \$300 (list \$450). Sophistication and power in a notebook computer. Mainframe-type drive. Like new, under warranty. 212-442-7109. Cully, 77 LaBau Ave., Staten Is., NY 10301. 9-57

(134A) HEWLETT PACKARD COMPUTERS WANTED

SERIES 80 computer, I/O ROMs, etc. 502-683-9871. 5-57

(134B) HEWLETT PACKARD SOFTWARE, PERIPH.

HP-IL PERIPHERALS HP-82163 Video Interface \$140, HP-82165A IL/GPIO Interface with parallel printer cable \$160. HP-82162A IL thermal printer with eight rolls of paper \$260, PP UPS continental USA. Call 513-426-6754 after 5 EDT. Larry D. Hutchison, 2116 Mohare Dr., Beaver-creek, OH 45431. 9-57

dBASE II available for HP2621 for \$85. Call Joe at 505-266-2344. 9-58 **ALTOS 8000-10** w/10 meg, hard disk, magnetic tape backup, 3 terminals, one-line printer, one daisy printer, software. Call 404-320-1375.

HP-120/125 COMMUNICATIONS with auto-dial, file upload and download, VT-100 emulation, and remote mode supporting ASCII, Binary, and EBCDIC data. Precision Computer Systems, 308 Main Street, Havelock, NC 28532. 919-447-1301. 5-57

(136) DATA GENERAL SYSTEMS

DATA GENERAL Buy - Sell - Used equipment and peripherals. Contact office nearest you for your FREE brochure. Texas 214-780-1600; Illinois 217-351-7982; Nevada 702-739-5356. International Computer Remarketing, 3-57

(138) DATA GENERAL, SOFTWARE, PERIPH.

(142) DATAPOINT SYSTEMS

(144) DATAPOINT SOFTWARE, PERIPH.

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MONITORS, MODEMS, GRAPHICS TABLETS, INTERFACE CARDS, BUFFERS, CABLES, SWITCH BOXES, STANDBY POWER, UPS, SURGE PROTECTORS, PRINTERS, FURNITURE, PAPER, RIBBONS, DISKETTES, DISKETTE STORAGE, LABELS AND MORE.

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3M BULK DISKETTES AT TREMENDOUS SAVINGS!

These are genuine 3M diskettes with a lifetime warranty. But they are bulk packed in cartons of 50 with separate white Tyvek envelopes. No identification labels, write protect tabs or cartons are provided! A great buy for volume users.

\$155 ea. 5 1/4" SSDD Qty. 50 **\$197** ea. 5 1/4" DSDD Qty. 50

5 1/4" SSDD-96TPI \$2.15 5 1/4" DSDD-96TPI \$2.70

All have reinforced hub SOFT SECTOR ONLY! (for IBM, APPLE, KAYPRO, DEC and about 99% of all computers.) Must be ordered in multiples of 50!

BOXED 3M DISKETTES WITH ALL THE TRIMMINGS!

Factory-fresh 3M packaging with envelopes, 3M logo labels, ID labels and write-protect tabs.

\$169 ea. 5 1/4" SSDD Qty. 20 **\$223** ea. 5 1/4" DSDD Qty. 20

5 1/4" SSDD-96TPI \$2.60 8" SSDD \$2.05 5 1/4" DSDD-96TPI \$3.25 8" SSDD \$2.50 8" DSDD \$3.10

Minimum order of 20 diskettes. Additional diskettes in multiples of 10.

3M HEADCLEANING KITS

Stop swearing and start cleaning. This non-abrasive cleaning kit has everything you need for thirty applications.

\$23.00 - \$1.50 Shpg

SAVE MONEY WITH A CLEAN COMPUTER! INTRODUCING MINI-VAC

Most computer malfunctions are caused by dust. MINI-VAC is ideal for cleaning keyboards, screens, drives and printers. (Great for photo equipment, too!) Equipped with an easy-empty bag, two directional wands and two fine-brush nozzles. Don't compute without it. (Requires 9-volt battery which is not included.)

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AT LAST: A DISK DRIVE DIAGNOSTICS SYSTEM THAT WORKS!

The Dymek Recording Interchange Diagnostic (RID) is a professional, but easy to use, drive diagnostic disk. It tests drive speed, radial position, hysteresis, write function, erase cross-talk, signal-to-noise and clamping. In short, it's a professional's system that will help you keep your machine in prime condition - and avoid the evils of data loss.

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MEDIA-MATE 50:

A REVOLUTION IN DISKETTE STORAGE Every once in a while, someone takes the simple, and makes it elegant. This unit holds 50 5 1/4" diskettes, has grooves for easy stacking, nipples to keep diskettes from slipping in the case and several other features. We like it.

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DISKETTE 70 STORAGE: STILL A GREAT BUY!

Dust-free storage for 70 5 1/4" diskettes. Six dividers included. An excellent value.

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5 1/4" \$165 ea. + 20 Shpg.

Shipping: 5 1/4" DISKETTES—Add \$3.00 per 100 or fewer diskettes. 8" DISKETTES—Add \$4.00 per 100 or fewer diskettes. OTHER ITEMS: Add shipping charges as shown in addition to diskette shipping charges. Payment: VISA and Mastercard accepted. COD orders only add \$3.00 handling charges. Taxes: Illinois residents please add 6% sales tax.

WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!

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Hours: 9AM - 5PM Central Time

Minimum Order: \$35.00

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All orders are shipped C.O.D. or pre-paid.

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1-405-354-0464

**(148) DEC SYSTEMS
FOR SALE**

DEC PDP11/34a system with 128k memory, 2 RK05 disk drives and 1 RK06 disk drive. Comes with 2 crt's and a printer port. Can be expanded. \$8500. Wayne Simpson, 629 Lexington Road, Sapulpa, OK 74066. 9-57

DIGITAL DECWRITER IV: Terminal/Printer. Excellent condition. \$365. Add for UPS. Hugh A. Smith, 222 Lyons Drive, Frankfort, KY 40601. 502-227-4687.

DIGITAL WPS Word Processor great condition! 2-RX02 disk drives WT-78 terminal includes list processing, \$1500. 614-846-6596. Mike Hard, P.O. Box 292555, Columbus, Ohio 43229. 9-57

FOR SALE DEC PDT 11/150 Processor. VT 100 Terminal, LA 120 KSR Printer, Accessories. Software. OS. Call 615-690-8720. Earl Faulkner, General Business Services, 8702 Villa Crest Circle, Knoxville, Tennessee 37923. 9-58

**(149) DEC SYSTEMS
WANTED**

PDP-8E software, hardware, and documentation wanted. Especially paper tape software, PAL-8, OS/8, and original owner's manuals. Copies are acceptable. Send list with prices to Dennis Cashton, 225

**LSI-11 USERS
CP/M ON YOUR Q-BUS
FOR \$695 - CP/M 2.2
INCLUDED**

THE HY-DISK Z-11™ PUTS THE ENTIRE CP/M-80 SOFTWARE BASE AT YOUR DISPOSAL. SIMPLY PLUG IN THE DUAL WIDE Q-BUS BOARD, AND BOOT YOUR RX01 OR RX02 INSTANTLY!

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- INSTANT INSTALLATION GUARANTEED
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PHONE: 619/277-8753

Route 110, Suite 136, Farmingdale, NY 11735.

**(150) DEC SOFTWARE,
PERIPHERAL**

DEC 10 Meg Hard Drive. Never used Seagate ST-412. W/tray for DEC, IBM, etc. Bought in Computer Shopper for \$599.-selling for \$425! Mr. Poster, Box 1883, So Hack, NJ 07606, (201)794-9606/6696.

infoPROBE a powerful data base program for scientific and commercial research. Easy to use: no programming required. Powerful multifield selection. Large file handling; up to 300 items/record. Quick results: selected lists, statistics, bar charts and scattergrams. Price \$445. Complete demonstration diskette and user's manual \$25. For IBM-pc, CP/M, RT-11, TSX and RSTS. infoPROBE is one of several research-oriented programs. Call or write for additional information. Centre Computer Consultants, P.O. Box 739, State College, PA 16804. 814-237-4535. 7-65

**(154) IBM SYSTEMS
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2 IBM-PC keyboards. One Mint in original box. \$100. One used 3 months. \$75. Don Triplett, 512-381-0272. Route 4 Box 639A, Edinburg, TX 78539.

**(155) IBM SYSTEMS
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5 1/4" DISC DRIVES**\$99.00***

For IBM-PC, TRS-80, TI-99, Seequa, etc. Top quality, MPI Model 51 and 52 disc drives (TM 100-1 and TM 100-2 equivalents). Forty Track fast 5 ms stepping rate. These are new units from major OEM's overstock. All are fully tested and guaranteed for 90 days. Top quality case and power supply \$59.00. Cables: 2 drive \$23; 4 drive \$32. UPS shipping \$7.50 per drive. \$10.00 with case. COD add \$3.00. Credit cards (add 3%), Bank check or money order only. Phone orders 212-947-6029. Quick, full in house service on all drives sold. Dealer inquiries invited.

MPI #51 SSDD two drives \$198.00; one drive\$119.00
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IBM 5100 models B1-C4 with 5106, 5103. Working condition. 415-355-2075. 4-62

**(156) IBM SOFTWARE,
PERIPHERAL**

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WANTED: Would like to trade non-copyrighted software for IBM-PC and Apple. A.F.L., Box 414, Storrs, CT 06268. 9-58

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ACNAP - Fast machine code analyzes electronic circuits. MonteCarlo, Worst Case, and Sensitivity analysis, \$52.95.

SPP - Signal Processing Program analyzes linear/nonlinear systems

and circuits, transfer functions, 512 Point FFT, transient analysis, more, \$62.95. All programs share files. For CP/M, MSDOS, PC DOS, TRSDOS. BV Engineering, Box 3429, Riverside, CA 92519. 714-781-0252. 8-56

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(160) NCR SYSTEMS**(162) NCR SOFTWARE,
PERIPHERAL****(166) MISC. (HARDWARE
& SOFTWARE)**

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(170) CARD READERS

DOCUMENTATION FM-200 DUAL READ Card Reader. Unused still in carton. \$400. Roger, 408-462-4864. 2225 Wharf Rd., Capitola, Calif. 95010. 9-57

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SA 860 8" DSDD Mint Shugart Drives half-height. These drives do not require AC to operate, TK to TK access time 3 MS, 1.6 Megabyte capacity. Come with 60 day warranty. \$279. C.E.C. 415-342-4058. P.O. Box 1965, Burlingame, Calif. 94010.

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HELP! Need CP/M for Persci disk controller and 299 drives. Phone 901-925-3106 days, 901-925-8335 after 7:00 p.m.

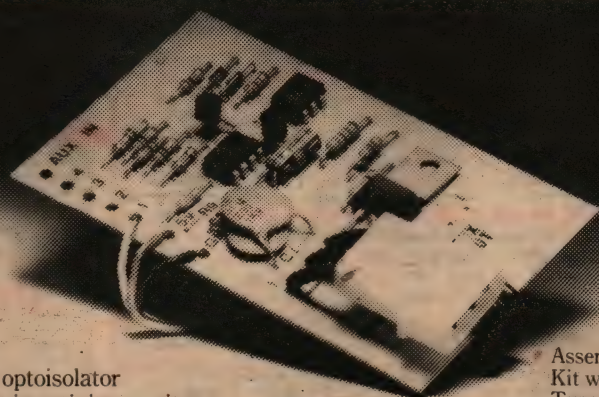
MICROPOLIS MOD II external drives (two-300K each). In cabinet, with power supply, and cable. Reconditioned. Only \$450. 302-999-0514.

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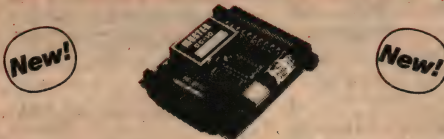
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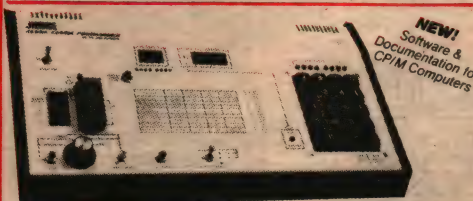
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• Over 250 word vocabulary-affixes allow the formation of more than 500 words • Built-in amplifier, speaker, volume control, and audio jack • Recreates a clear, natural male voice • Plug-in user ready with documentation and sample software • Case size: 7 1/4" L x 3 1/4" W x 1-3/8" H

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JM16A	2716, TMS2516 (Ti)	25V	Intel, Motorola, Nat., NEC, TI, AMD, Hitachi, Mostek	\$14.95
JM16B	TMS2716 (3-V _{cc})	-5V, +5V, +12V	Motorola, TI	\$14.95
JM32A	TMS2532	25V	Motorola, TI, Hitachi, OKI	\$14.95
JM32B	2732	25V	AMD, Fujitsu, NEC, Hitachi, Intel, Mitsubishi, National	\$14.95
JM32C	2732A	21V	Fujitsu, Intel	\$14.95
JM64A	MC68754, MC68754A	21V	Motorola	\$14.95
JM64B	2764	21V	Intel, Fairchild, OKI	\$14.95
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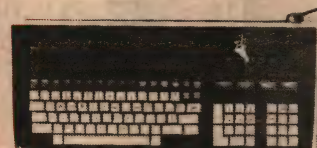
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Nationally Known Manufacturer!



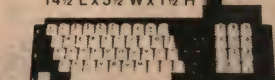
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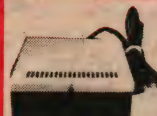
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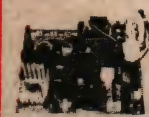
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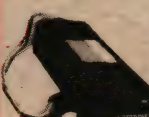
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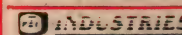
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Erases 2708, 2716, 2732, 2764, 2516, 2532, 2564. Erases up to 8 chips within 51 minutes (1 chip in 37 minutes). Maintains constant exposure distance of one inch. Special conductive foam liner eliminates static build-up. Built-in safety lock to prevent UV exposure. Compact — only 9.00" x 3.70" x 2.60". Complete with holding tray for 8 chips.

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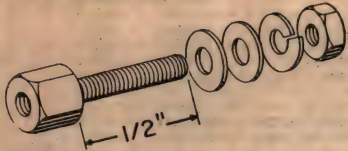
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SN7404N	14	25	SN7476N	14	35	SN74162N	16	69
SN7405N	14	25	SN7477N	14	45	SN74163N	16	69
SN7406N	14	45	SN7478N	14	89	SN74164N	14	69
SN7407N	14	29	SN7479N	14	49	SN74165N	16	69
SN7408N	14	25	SN7480N	14	89	SN74166N	16	89
SN7409N	14	25	SN7481N	14	49	SN74167N	16	29
SN7410N	14	25	SN7482N	14	49	SN74168N	16	89
SN7411N	14	25	SN7483N	14	59	SN74169N	16	89
SN7412N	14	49	SN7484N	14	59	SN74170N	16	129
SN7413N	14	49	SN7485N	14	59	SN74171N	16	29
SN7414N	14	49	SN7486N	14	35	SN74172N	24	49
SN7415N	14	25	SN7487N	14	35	SN74173N	16	69
SN7416N	14	25	SN7488N	14	35	SN74174N	16	69
SN7417N	14	25	SN7489N	14	35	SN74175N	16	69
SN7418N	14	25	SN7490N	14	35	SN74176N	14	69
SN7419N	14	25	SN7491N	14	35	SN74177N	14	69
SN7420N	14	19	SN7492N	14	35	SN74178N	14	69
SN7421N	14	19	SN7493N	14	35	SN74179N	14	69
SN7422N	14	49	SN7494N	14	49	SN74180N	14	69
SN7423N	16	59	SN7495N	14	49	SN74181N	24	19
SN7424N	16	59	SN7496N	14	49	SN74182N	16	119
SN7425N	14	29	SN7497N	16	325	SN74183N	16	249
SN7426N	14	29	SN7498N	16	325	SN74184N	16	249
SN7427N	14	25	SN7499N	16	325	SN74185N	16	249
SN7428N	14	59	SN7500N	16	325	SN74186N	16	249
SN7429N	14	25	SN7501N	16	325	SN74187N	16	249
SN7430N	14	25	SN7502N	16	325	SN74188N	16	249
SN7431N	14	25	SN7503N	16	325	SN74189N	16	249
SN7432N	14	29	SN7504N	16	325	SN74190N	16	249
SN7433N	14	25	SN7505N	16	325	SN74191N	16	249
SN7434N	14	25	SN7506N	16	325	SN74192N	16	249
SN7435N	14	25	SN7507N	16	325	SN74193N	16	249
SN7436N	14	25	SN7508N	16	325	SN74194N	16	249
SN7437N	14	25	SN7509N	16	325	SN74195N	16	249
SN7438N	14	25	SN7510N	16	325	SN74196N	16	249
SN7439N	14	25	SN7511N	16	325	SN74197N	16	249
SN7440N	14	19	SN7512N	16	325	SN74198N	16	249
SN7441N	16	89	SN7513N	16	325	SN74199N	16	249
SN7442N	16	89	SN7514N	16	325	SN74200N	16	249
SN7443N	16	125	SN7515N	16	325	SN74201N	16	249
SN7444N	16	125	SN7516N	16	325	SN74202N	16	249
SN7445N	16	69	SN7517N	16	325	SN74203N	16	249
SN7446N	16	69	SN7518N	16	325	SN74204N	16	249
SN7447N	16	69	SN7519N	16	325	SN74205N	16	249
SN7448N	16	69	SN7520N	16	325	SN74206N	16	249
SN7449N	16	69	SN7521N	16	325	SN74207N	16	249
SN7450N	16	69	SN7522N	16	325	SN74208N	16	249
SN7451N	16	69	SN7523N	16	325	SN74209N	16	249
SN7452N	16	69	SN7524N	16	325	SN74210N	16	249
SN7453N	16	69	SN7525N	16	325	SN74211N	16	249
SN7454N	16	69	SN7526N	16	325	SN74212N	16	249
SN7455N	16	69	SN7527N	16	325	SN74213N	16	249
SN7456N	16	69	SN7528N	16	325	SN74214N	16	249
SN7457N	16	69	SN7529N	16	325	SN74215N	16	249
SN7458N	16	69	SN7530N	16	325	SN74216N	16	249
SN7459N	16	69	SN7531N	16	325	SN74217N	16	249
SN7460N	16	69	SN7532N	16	325	SN74218N	16	249
SN7470N	14	29	SN7533N	16	325	SN74219N	16	249

74LS

74LS02	14	29	74LS92	14	55	74LS193	16	79
74LS03	14	25	74LS93	14	55	74LS194	16	69
74LS04	14	35	74LS95	14	79	74LS195	16	69
74LS05	14	35	74LS96	16	89	74LS197	14	79
74LS08	14	29	74LS107	14	39	74LS221	16	89
74LS09	14	29	74LS109	16	39	74LS241	20	1 09
74LS10	14	29	74LS112	16	39	74LS242	14	1 09
74LS11	14	35	74LS113	14	39	74LS243	14	1 09
74LS12	14	35	74LS114	14	39	74LS244	20	1 49
74LS13	14	39	74LS122	14	49	74LS245	20	1 49
74LS14	14	59	74LS123	15	89	74LS247	16	1 09
74LS15	14	35	74LS125	14	59	74LS248	16	1 09
74LS20	14	29	74LS126	14	49	74LS249	16	1 09
74LS21	14	29	74LS132	14	59	74LS251	16	59
74LS22	14	29	74LS133	16	59	74LS253	16	59
74LS26	14	29	74LS136	14	39	74LS257	16	59
74LS27	14	29	74LS137	16	89	74LS258	16	59
74LS28	14	35	74LS139	15	79	74LS260	14	59
74LS30	14	29	74LS151	16	79	74LS266	14	69
74LS32	14	39	74LS153	16	59	74LS273	20	1 49
74LS33	14	35	74LS154	24	2 29	74LS279	16	49
74LS37	14	55	74LS155	16	69	74LS283	16	69
74LS38	14	55	74LS156	16	69	74LS290	14	69
74LS40	14	29	74LS157	16	69	74LS293	14	79
74LS42	16	55	74LS158	16	59	74LS295	16	89
74LS47	16	75	74LS160	16	69	74LS352	16	1 29
74LS48	16	75	74LS161	16	69	74LS353	16	1 29
74LS49	14	75	74LS162	16	69	74LS365	16	49
74LS51	14	25	74LS163	16	69	74LS366	16	49
74LS54	14	25	74LS164	14	69	74LS367	16	49
74LS55	14	29	74LS165	16	1 19	74LS368	16	49
74LS73	14	39	74LS168	16	1 19	74LS373	20	1 49
74LS74	14	49	74LS169	16	1 19	74LS374	20	1 49
74LS75	14	49	74LS170	16	1 49	74LS375	16	69
74LS76	14	39	74LS173	16	69	74LS386	16	1 49
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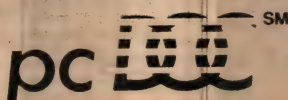
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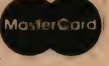
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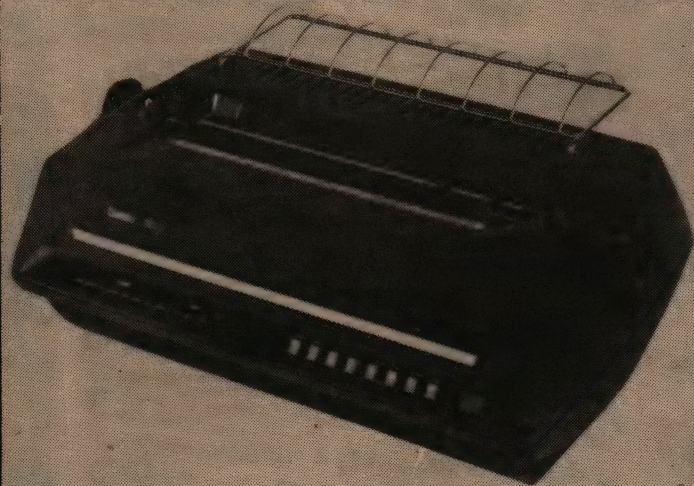
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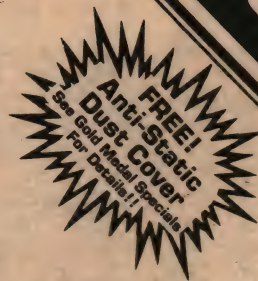
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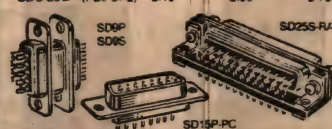
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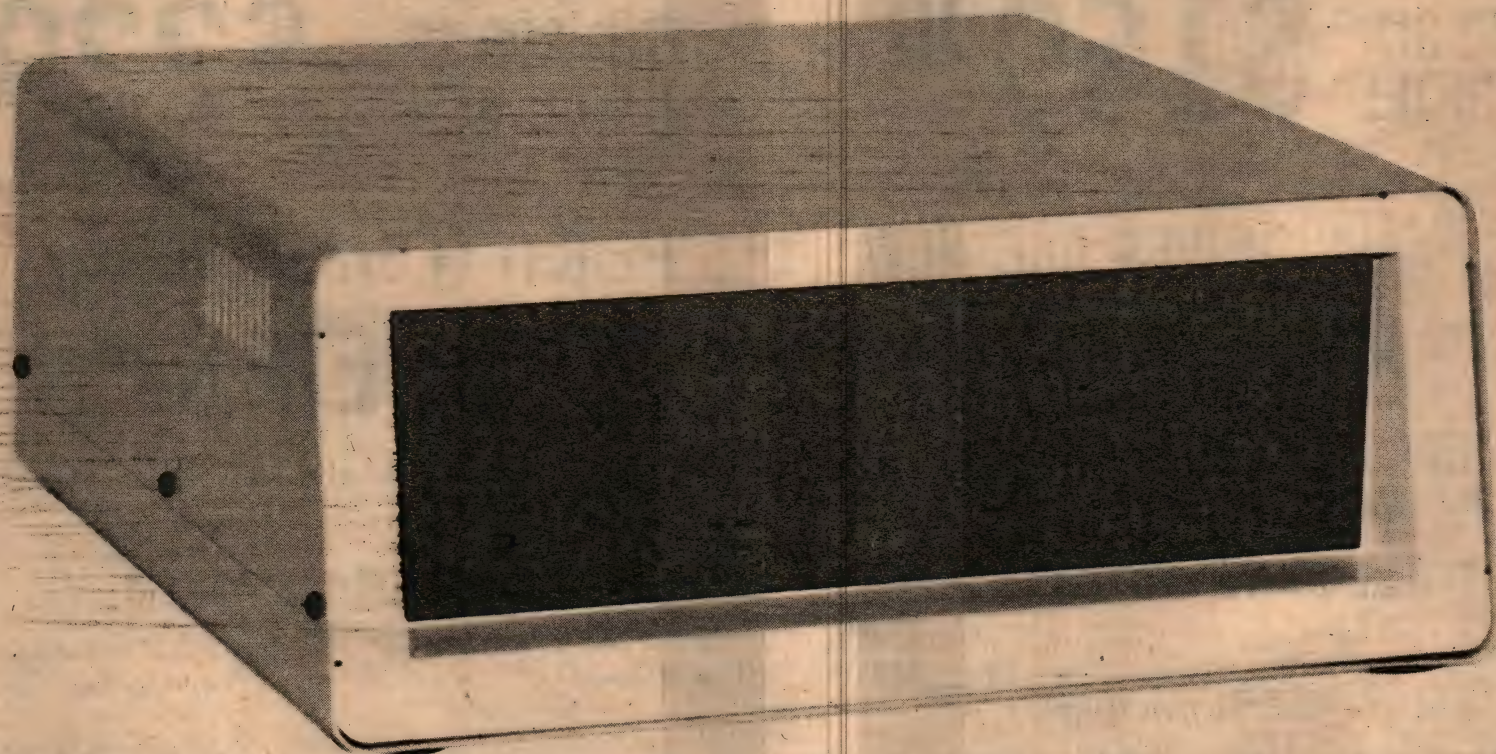
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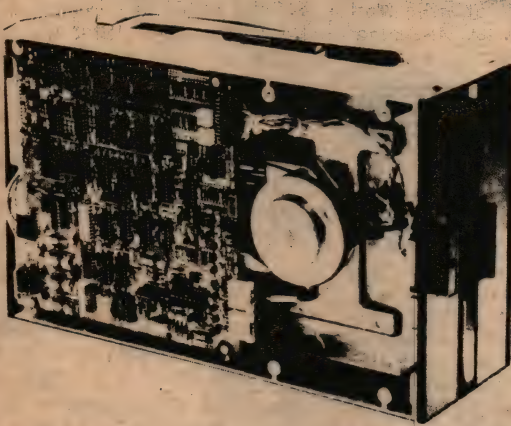
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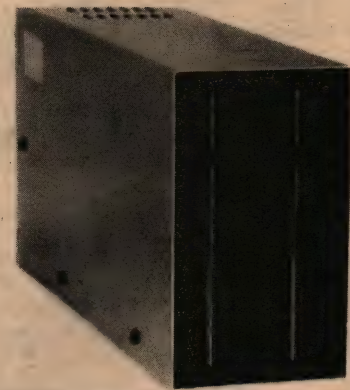


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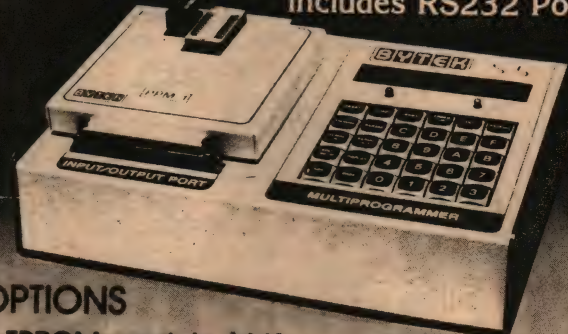
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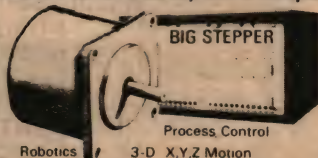
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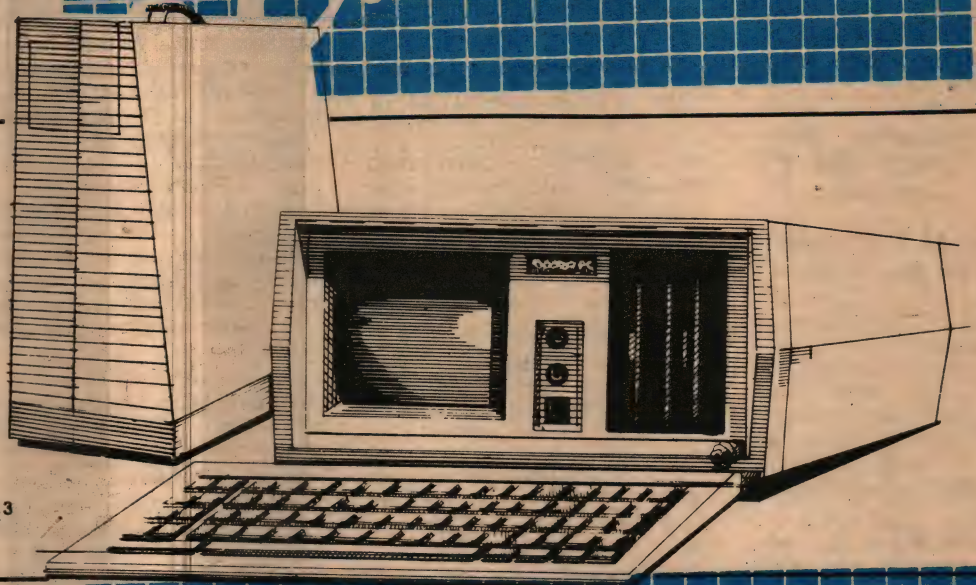
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2 Drive System-\$1495 complete with cables.
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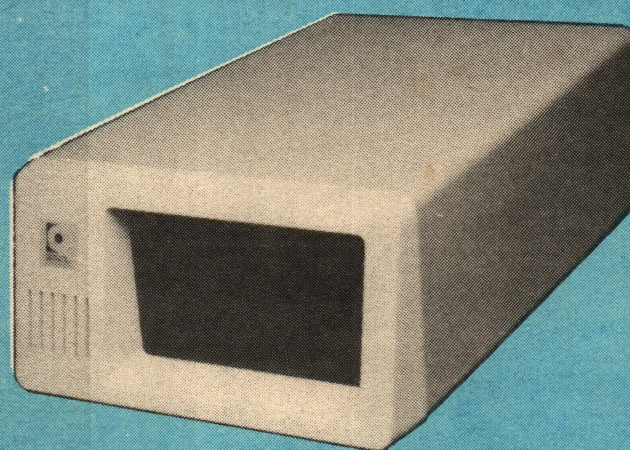
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